



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

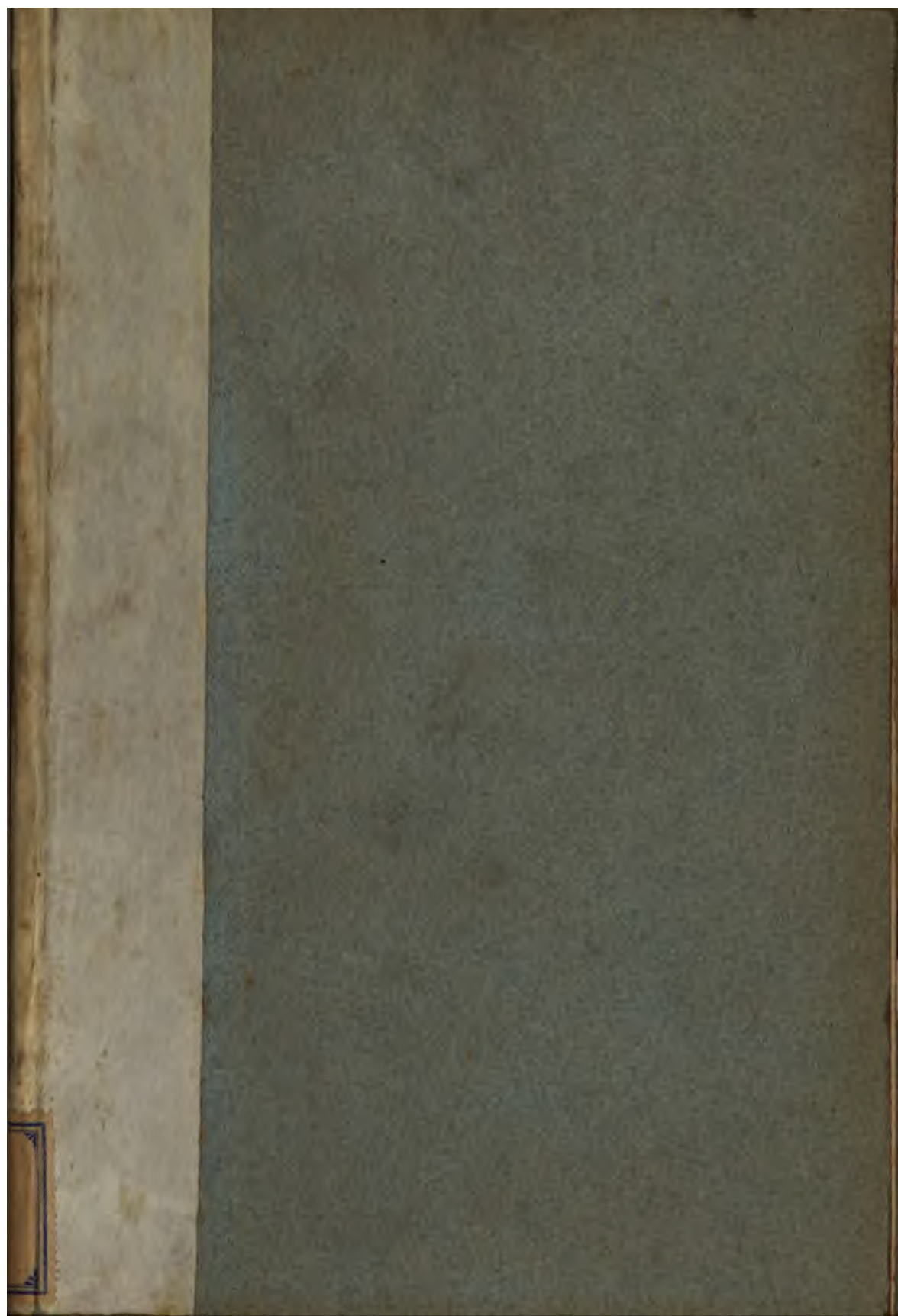
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

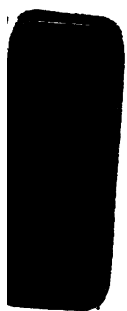
We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>







CATALOGUE.

MINERALOGY.

A. PHYSICAL CHARACTERS OF MINERALS.

- | | |
|------------------------------------|--------------------------------|
| 1. STRUCTURE AND IMITATIVE SHAPES. | 6. HARDNESS. |
| 2. PSEUDOMORPHISM. | 7. LUSTRE AND COLOUR. |
| 3. TWIN CRYSTALS. | 8. DIAPHANEITY. REFRACTION. |
| 4. AGGREGATION AND FRACTURE. | 9. TASTE AND ODOUR. |
| 5. CLEAVAGE. | 10. ELECTRICITY AND MAGNETISM. |

B. CHEMICAL CHARACTERS OF MINERALS.

1. FUSIBILITY.

GOVERNMENT CENTRAL MUSEUM,
MADRAS.

BY ORDER OF THE GOVERNMENT

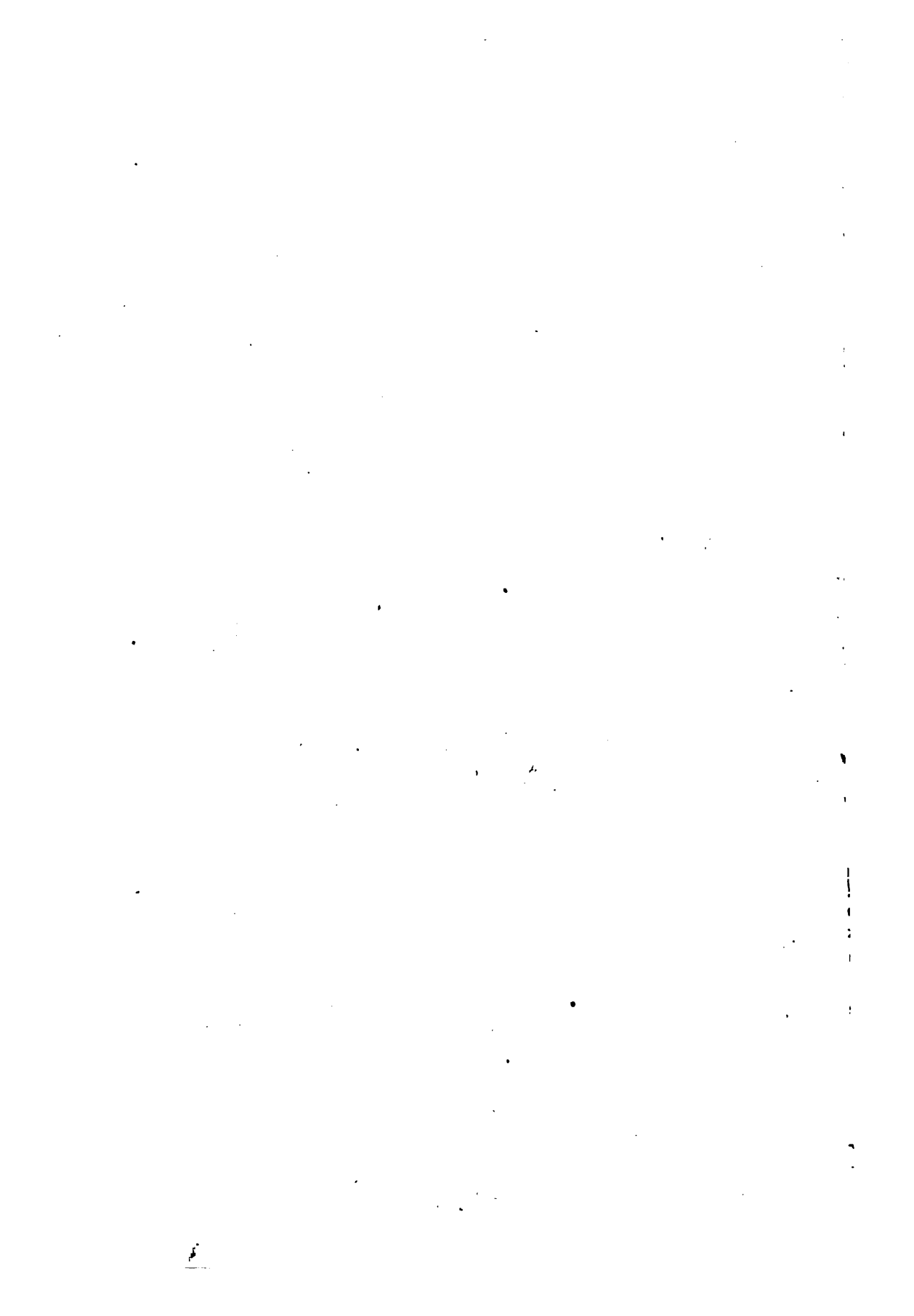
MADRAS.

Price 1½ Rupee.

MADRAS :

Printed at the Military Male Orphan Asylum Press, Mount Road.

1855.



C A T A L O G U E
OF THE
GOVERNMENT CENTRAL MUSEUM,
M A D R A S.

ARRANGED AND COMPILED
BY
EDWARD BALFOUR, Esq., SURGEON, MADRAS ARMY,
OFFICER IN CHARGE.

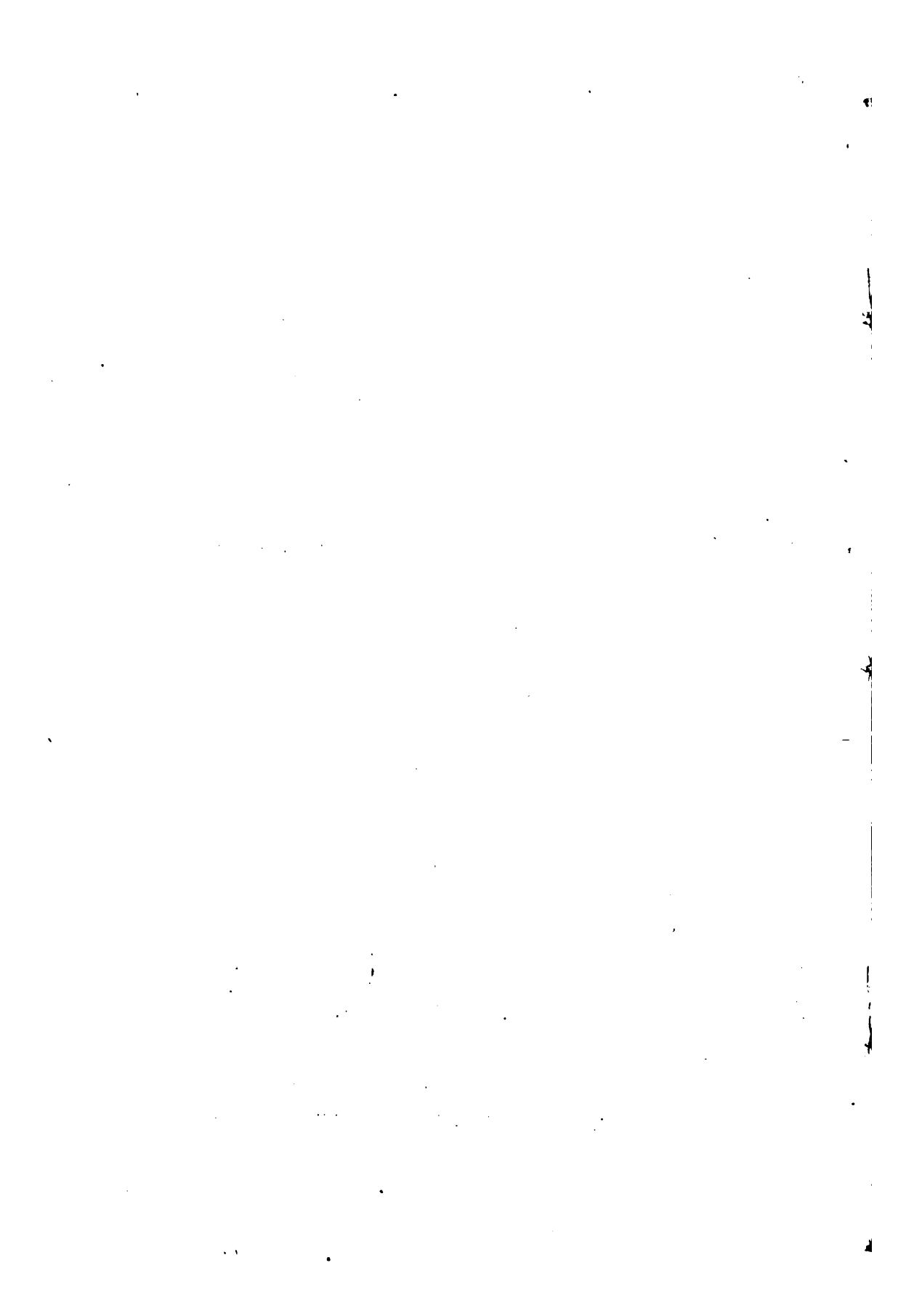
PHYSICAL AND CHEMICAL CHARACTERS
OF
MINERALS.

BY ORDER OF THE GOVERNMENT
OF
M A D R A S.



MADRAS:
Printed at the Military Male Orphan Asylum Press, Mount Road.
1855.

122.c 113^a



C O N T E N T S.

| | |
|--------------------------------------|----|
| PHYSICAL CHARACTERS OF MINERALS..... | 1 |
| STRUCTURE AND IMITATIVE SHAPES..... | 3 |
| PSEUDOMORPHISM..... | 7 |
| TWIN CRYSTALS..... | 9 |
| AGGREGATION..... | 11 |
| FRACTURE..... | 12 |
| CLEAVAGE..... | 17 |
| HARDNESS..... | 19 |
| LUSTRE..... | 21 |
| COLOUR..... | 23 |
| DIAPHANEITY..... | 33 |
| REFRACTION..... | 34 |
| PHOSPHORESCENCE..... | 35 |
| TASTE..... | 37 |
| ODOUR..... | 37 |
| ELECTRICITY..... | 39 |
| MAGNETISM..... | 42 |
| CHEMICAL CHARACTERS OF MINERALS..... | 45 |

THE
FEDERAL
BUREAU OF
INVESTIGATION
OF THE
DEPARTMENT OF JUSTICE
WASHINGTON, D. C.
20535

MEMORANDUM FOR THE DIRECTOR, FBI

SUBJECT: [Illegible]

DATE: [Illegible]

TO: [Illegible]

FROM: [Illegible]

RE: [Illegible]

[The following text is extremely faint and largely illegible, appearing to be a series of lines or a list.]

INDEX.

| NAMES OF MINERALS. | <i>In illustration of</i> | No. | NAMES OF MINERALS. | <i>In illustration of</i> | No. |
|------------------------------------|---|-----|--|---|-----|
| A. | | | | | |
| Actinolite, glassy..... | Lustre and Color.. | 70 | Augite..... | Twin Crystals | 1 |
| Actinolite, glassy..... | Scale of Fusibility.. | 5 | Augite, Prismatical... | Lustre and Color... | 72 |
| Actinolite, glassy..... | Scale of Hardness.. | 4 | Augite, Prismatical... | Lustre and Color... | 118 |
| Agate..... | Structure and Imitative Shapes. . . | 18 | Avanturine, Felspathic.. | Lustre and Color.. | 115 |
| Agalmatolite..... | Aggregation & Fracture..... | 26 | Axstone, figure stone. . . | Aggregation & Fracture... .. | 12 |
| Alunogene..... | Taste and Odour.. | 5 | B. | | |
| Allophane..... | Refraction, Diaphaneity and Phosphorescence.... | 23 | Barytes, Carbonate of.. | Electricity & Magnetism | 9 |
| Amethyst..... | Lustre and Color.. | 56 | Barytes ; Heavy spar.. | Electricity & Magnetism..... | 10 |
| Amphibole..... | Lustre and Color.. | 50 | Barytes ; Heavy spar.. | Cleavage | 10 |
| Amphibole..... | Lustre and Color.. | 51 | Basalt..... | Aggregation & Fracture..... | 15 |
| Amphibole fibreux..... | Refraction, Diaphaneity and Phosphorescence.... | 27 | Basalt..... | Lustre and Color.. | 48 |
| Amphibole, common ... | Cleavage..... | 19 | Beryl, common | Cleavage..... | 11 |
| Andalusite, prismatic.. | Pseudomorphism. . | 15 | Beryl, Noble..... | Lustre and Color .. | 66 |
| Anhydrite..... | Electricity & Magnetism | 3 | Beryl, Noble..... | Refraction, Diaphaneity and Phosphorescence... .. | 12 |
| Anhydrite..... | Aggregation & Fracture | 57 | Bismuth, Octohedral ... | Refraction, Diaphaneity and Phosphorescence | 20 |
| Anhydrite..... | Lustre and Color... | 60 | Bitumen | Aggregation & Fracture..... | 38 |
| Antimony Ore, gray.... | Lustre and Color.. | 1 | Bitumen, Elastic..... | Aggregation & Fracture..... | 32 |
| Antimony Ore, gray.... | Scale of Fusibility.. | 2 | Bitumen, Solid..... | Taste and Odour.. | 8 |
| Antimony Blende Prismatic..... | Lustre and Color.. | 101 | Blende, Prismatic Rhomboidal Rubi..... | Lustre and Color.. | 92 |
| Anthraconite..... | Taste and Odour... | 14 | Bronzeite..... | Lustre and Color... | 15 |
| Apatite, Rhombohedral. | Scale of Hardness.. | 9 | Brown Coal..... | Lustre and Color... | 52 |
| Apatite, conchoidal.... | Lustre and Color.. | 73 | Brown Coal..... | Lustre and Color... | 111 |
| Arsenical Pyrites, prismatic..... | Taste and Odour.. | 18 | C. | | |
| Arsenical Pyrites, axotomous | Lustre and Color.. | 30 | Calcedony, common.... | Aggregation & Fracture... .. | 61 |
| Arsenic, Native. | Refraction, Diaphaneity and Phosphorescence.... | 21 | Calcedony, common.... | Lustre and Color... | 22 |
| Arragonite..... | Electricity & Magnetism | 5 | Calcedony, common.... | Lustre and Color... | 41 |
| Arragonite..... | Structure and Imitative Shapes. . . | 26 | Calcedony, common.... | Lustre and Color... | 59 |
| Arragonite..... | Lustre and Color.. | 36 | Calamine..... | Electricity & Magnetism..... | 38 |
| Arragonite..... | Lustre and Color.. | 116 | Calamine..... | Electricity & Magnetism... .. | 13 |
| Arragonite..... | Refraction, Diaphaneity and Phosphorescence.... | 10 | Calcite: Calcareous spar | Lustre and Color... | 6 |
| Asbestos, common.... | Structure and Imitative Shapes. . . | 7 | Calcite: Calcareous spar | Scale of Hardness.. | 2 |
| Asbestos, common | Aggregation & Fracture..... | 13 | Calcite: Calcareous spar | Refraction, Diaphaneity and Phosphorescence.... | 4 |
| Asphalte..... | Aggregation & Fracture..... | 45 | Celestine..... | Electricity & Magnetism... .. | 11 |
| Augite..... | Electricity & Magnetism | 22 | Celestine..... | Lustre and Color.. | 20 |
| | | | Celestine..... | Cleavage..... | 14 |
| | | | Cerolite..... | Aggregation & Fracture..... | 44 |

| NAMES OF MINERALS. | In illustration of | No. | NAMES OF MINERALS. | In illustration of | No. |
|---|---|-----|---------------------------|---|-----|
| Chalk, Black..... | Aggregation & Frac- ture..... | 30 | D. | | |
| Chromic iron..... | Electricity & Mag- netism..... | 44 | Diopside..... | Refraction, Diapha- neity and Phos- phorescence.... | 16 |
| Chrysoprase..... | Lustre and Color.. | 69 | Diamond, Octohedral... | Scale of Hardness.. | 10 |
| Chrysolite..... | Lustre and Color.. | 75 | | | |
| Chlorophyllite..... | Pseudomorphism.. | 6 | E. | | |
| Clay..... | Taste and Odour... | 10 | Egerane..... | Electricity & Mag- netism..... | 27 |
| Clay mixed with red oxide of Iron: Rothel. | Aggregation & Frac- ture..... | 29 | Ehrenbergit..... | Aggregation & Frac- ture..... | 28 |
| Clay Slate, Devonian.. | Aggregation & Frac- ture..... | 70 | Electroscope, a delicate. | | |
| Cleavelandite..... | Aggregation & Frac- ture..... | 4 | Epidote..... | Electricity & Mag- netism..... | 23 |
| Cleavelandite..... | Aggregation & Frac- ture..... | 5 | Epsom Salt..... | Taste and Odour... | 7 |
| Cleavelandite..... | Aggregation & Frac- ture..... | 6 | Erdwachs..... | Aggregation & Frac- ture..... | 37 |
| Cleavelandite..... | Twin Crystals... .. | 11 | F. | | |
| Coal, Foliated..... | Lustre and Color.. | 4 | Felspar..... | Pseudomorphism.. | 1 |
| Coal, Foliated..... | Refraction, Diapha- neity and Phos- phorescence.... | 24 | Felspar, Compact.. | Aggregation & Frac- ture..... | 59 |
| Cobalt Pyrites, Hexahe- dral..... | Lustre and Color... | 32 | Felspar, Labrador..... | Lustre and Color.. | 113 |
| Cobalt, Tin white.. | Structure and Imita- tive Shapes... .. | 8 | Felspar, Prismatic..... | Electricity & Mag- netism..... | 20 |
| Cobalt, Tin white.. | Structure and Imita- tive Shapes... .. | 37 | Felspar, Prismatic.. | Structure and Imita- tive Shapes.... | 38 |
| Cobalt, Oxide of..... | Lustre and Color... | 54 | Felspar, Prismatic,.. | Twin Crystals... .. | 8 |
| Cobalt Ochre, Red.... | Lustre and Color.. | 99 | Felspar, Prismatic..... | Twin Crystals.... | 12 |
| Coeccolite..... | Lustre and Color.. | 74 | Felspar, Prismatic..... | Cleavage..... | 5 |
| Copper, Blue..... | Lustre and Color.. | 55 | Felspar, Prismatic..... | Scale of Fusibility. | 1 |
| Copper, Blue..... | Lustre and Color... | 63 | Felspar, Prismatic..... | Refraction, Diapha- neity and Phos- phorescence.... | 15 |
| Copper, Indigo..... | Lustre and Color.. | 62 | Felspar, Prismatic..... | Scale of Hardness.. | 3 |
| Copper, Octohedral... | Structure and Imita- tive Shapes... .. | 28 | Felspar, Prismatic..... | Twin Crystals..... | 9 |
| Copper, Octohedral... .. | Aggregation & Frac- ture..... | 10 | Felspar, Prismatic..... | Lustre and Color... | 94 |
| Copper, Octohedral... | Lustre and Color.. | 26 | Felspar, Prismatic..... | Refraction, Diapha- neity and Phos- phorescence.... | 105 |
| Copper, Pyrites..... | Cleavage..... | 28 | Fibrolite..... | Aggregation & Frac- ture..... | 14 |
| Copper, Variegated,... | Refraction, Diapha- neity and Phos- phorescence.... | 22 | Fluor-spar..... | Electricity & Mag- netism..... | 4 |
| Copper, Vitreous..... | Aggregation & Frac- ture..... | 39 | Fluor-spar..... | Aggregation & Frac- ture..... | 3 |
| Copper, Silico-Carbo- nate of, on Heavy Spar | Lustre and Color.. | 64 | Fluor-spar..... | Lustre and Color.. | 39 |
| Cordierite..... | Electricity & Mag- netism..... | 25 | Fluor-spar..... | Cleavage..... | 1 |
| Cordierite..... | Lustre and Color... | 119 | Fluor-spar..... | Scale of Hardness.. | 6 |
| Corundum, Rhomboidal | Scale of Hardness.. | 7 | Fluor-spar..... | Refraction, Diapha- neity and Phos- phorescence.... | 14 |
| Corundum, dodecahedral | Lustre and Color.. | 95 | Flint..... | Refraction, Diapha- neity and Phos- phorescence.... | 28 |
| Criolite..... | Cleavage..... | 6 | Flint..... | Aggregation & Frac- ture..... | 64 |
| | | | Flint..... | Lustre and Color.. | 43 |

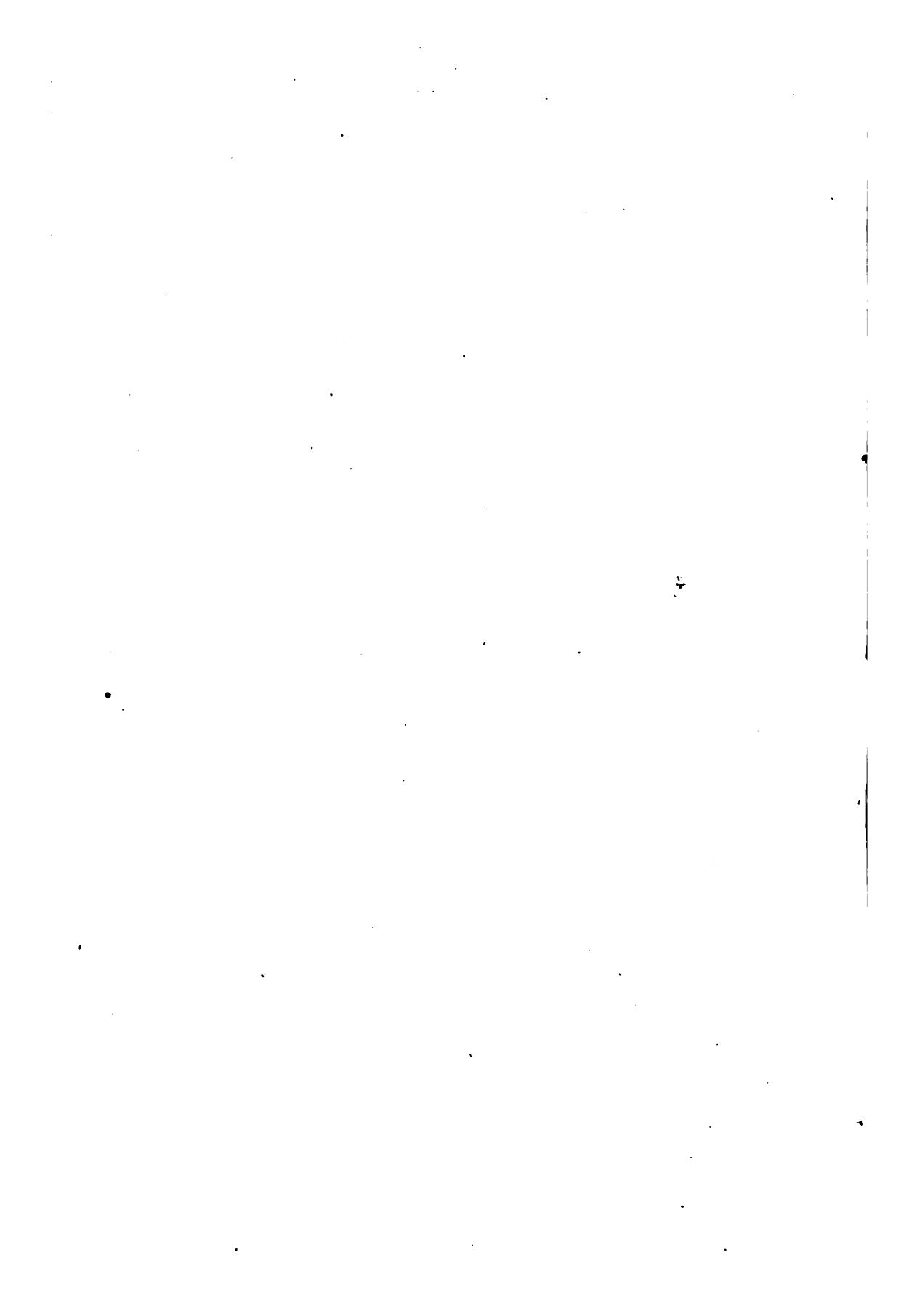
| NAMES OF MINERALS. | In illustration of | No. | NAMES OF MINERALS. | In illustration of | No. |
|------------------------------------|---|-----|--|---|-----|
| Flint..... | Lustre and Color... | 45 | Gypsum, fibrous | Lustre and Color.. | 16 |
| Flint..... | Refraction, Diaphaneity and Phosphorescence.... | 8 | Gypsum, in the form of rock salt..... | Pseudomorphism.. | 3 |
| Foliated Zeolite..... | Lustre and Color.. | 91 | H. | | |
| Franklinite..... | Electricity & Magnetism..... | 48 | Heavy-spar, compact... | Structure and Imitative Shapes.... | 17 |
| Fuller's Earth..... | Aggregation & Fracture..... | 27 | Heavy-spar, lameller... | Structure and Imitative Shapes.... | 13 |
| G. | | | Heliotrope..... | Aggregation & Fracture..... | 48 |
| Galena..... | Structure and Imitative Shapes.... | 40 | Heliotrope..... | Lustre and Color.. | 23 |
| Galena..... | Aggregation & Fracture..... | 49 | Hematite, fibrous brown | Structure and Imitative Shapes.... | 25 |
| Galena..... | Cleavage..... | 12 | Hematite..... | Pseudomorphism.. | 12 |
| Galena..... | Aggregation & Fracture..... | 40 | Honey-stone..... | Structure and Imitative Shapes.... | 32 |
| Galena..... | Lustre and Color... | 34 | Honey-stone | Lustre and Color.. | 82 |
| Garnet..... | Lustre and Color.. | 93 | Hornblende, Basaltic.... | Electricity & Magnetism..... | 21 |
| Garnet, Precious; Iron Garnet..... | Electricity & Magnetism..... | 28 | Hornblende, Basaltic... | Structure and Imitative Shapes.... | 39 |
| Garnet, Precious; Iron Garnet..... | Lustre and Color... | 100 | Hornstone..... | Aggregation & Fracture..... | 17 |
| Garnet, Precious; Iron Garnet..... | Scale of Fusibility. | 4 | Hornstone..... | Aggregation & Fracture..... | 60 |
| Gesso..... | Aggregation & Fracture..... | 56 | Hornstone..... | Lustre and Color.. | 107 |
| Gesso..... | Refraction, Diaphaneity and Phosphorescence.... | 6 | Hornstone..... | Aggregation & Fracture..... | 63 |
| Gilbertite..... | Lustre and Color.. | 13 | Hornstone in the form of Calcite | Pseudomorphism.. | 10 |
| Gold, Hexahedral..... | Lustre and Color.. | 31 | Hyacinth..... | Lustre and Color.. | 90 |
| Graphite, Rhomboidal. | Aggregation & Fracture..... | 25 | I. | | |
| Granite, Graphic..... | Aggregation & Fracture..... | 7 | Ichthyophthalmie.... | Cleavage..... | 20 |
| Green-earth..... | Pseudomorphism.. | 18 | Iron, Carbonate of: Chalybite. | Lustre and Color.. | 21 |
| Green-earth..... | Lustre and Color.. | 65 | Iron, Earthy blue. | Aggregation & Fracture..... | 61 |
| Gypsum..... | Electricity & Magnetism..... | 2 | Iron Glance..... | Lustre and Color.. | 18 |
| Gypsum..... | Twin Crystals | 3 | Iron Glance..... | Electricity & Magnetism..... | 50 |
| Gypsum..... | Scale of Hardness. | 12 | Iron Glance..... | Refraction, Diaphaneity and Phosphorescence.... | 17 |
| Gypsum..... | Aggregation & Fracture..... | 33 | Iron Glance..... | Refraction, Diaphaneity and Phosphorescence.... | 18 |
| Gypsum, Axifrangible.. | Aggregation & Fracture..... | 43 | Iron, Magnetic..... | Electricity & Magnetism..... | 43 |
| Gypsum, Axifrangible.. | Cleavage..... | 18 | Iron, Magnetic..... | Twin Crystals.... | 10 |
| Gypsum, Axifrangible.. | Refraction, Diaphaneity and Phosphorescence.... | 1 | Iron Ochre..... | Lustre and Color.. | 85 |
| Gypsum: Prismatic cube spar..... | Cleavage..... | 7 | Iron Ore, Magnetic.... | Electricity & Magnetism..... | 40 |
| Gypsum, fibrous | Structure and Imitative Shapes.... | 6 | | | |

| NAMES OF MINERALS. | <i>In illustration of</i> | No. | NAMES OF MINERALS. | <i>In illustration of</i> | No. |
|--|--|-----|--|---|-----|
| Iron Ore, Magnetic.... | Electricity & Magnetism..... | 41 | Kyanite, Prismatic.... | Aggregation & Fracture..... | 9 |
| Iron Pyrites..... | Lustre and Color.. | 2 | Kyanite, Prismatic.... | Lustre and Color... | 58 |
| Iron Pyrites..... | Pseudomorphism.. | 14 | L. | | |
| Iron Pyrites, Hexahedral.. | Aggregation & Fracture..... | 55 | Lead, Carbonate of.... | Twin Crystals.... | 4 |
| Iron Pyrites, Hexahedral.. | Pseudomorphism.. | 16 | Lead, Carbonate of.... | Electricity & Magnetism..... | 12 |
| Iron Pyrites, Hexahedral..... | Refraction, Diaphaneity and Phosphorescence... | 19 | Lead, Chromate of.... | Structure and Imitative Shapes.. | 36 |
| Ironstone, Clay.... | Structure and Imitative Shapes.. | 22 | Lead, Chromate of.... | Lustre and Color.. | 89 |
| Ironstone, Clay..... | Structure and Imitative Shapes.. | 23 | Lead, Green Phosphate of... | Lustre and Color... | 71 |
| Iron Ore, Red..... | Structure and Imitative Shapes.. | 2 | Lead-spar, Pyramidal... | Lustre and Color.. | 88 |
| Iron Ore, Red: Hematite | Structure and Imitative Shapes.. | 5 | Lead, Seleniuret of.... | Taste and Odour... | 20 |
| Iron Ore, Red..... | Structure and Imitative Shapes.. | 20 | Lepidocrocite..... | Structure and Imitative Shapes.... | 16 |
| Iron Ore, Rhomboidal.. | Electricity & Magnetism..... | 42 | Leptynite..... | Aggregation & Fracture..... | 50 |
| Iron Ore, Titaniferous, in Basalt..... | Electricity & Magnetism..... | 45 | Levyn..... | Twin Crystals.... | 6 |
| Iron Ore, Titaniferous.. | Electricity & Magnetism..... | 46 | Liebererit in Porphyry | Pseudomorphism.. | 4 |
| Iron, Tungstate of,.... | Structure and Imitative Shapes.. | 15 | Lime, Carbonate of.... | Electricity & Magnetism..... | 6 |
| Iron, Tungstate of.... | Lustre and Color.. | 3 | Lime, Carbonate of ... | Structure and Imitative Shapes.. | 1 |
| Iron, Tungstate of.... | Cleavage.. | 2 | Lime, Carbonate of.... | Structure and Imitative Shapes.. | 11 |
| Iserine..... | Electricity & Magnetism..... | 47 | Lime, Carbonate of.... | Aggregation & Fracture..... | 1 |
| J. | | | Lime, Carbonate of.... | Aggregation & Fracture..... | 2 |
| Jasper..... | Aggregation & Fracture..... | 65 | Lime, Carbonate of, in the form of Felspar... | Pseudomorphism.. | 19 |
| Jasper..... | Lustre and Color.. | 106 | Lime, Carbonate of, in the form of Gray Liasite..... | Pseudomorphism.. | 2 |
| Jasper, Porcelain... | Aggregation & Fracture..... | 54 | Lime, Carbonate of.... | Cleavage.. | 15 |
| Jasper, Ribbon..... | Aggregation & Fracture..... | 46 | Limestone, Granular.... | Structure and Imitative Shapes.. | 12 |
| Jasper, Striped..... | Lustre and Color.. | 25 | Limestone, Pisiforme.. | Structure and Imitative Shapes.. | 21 |
| K. | | | Limestone, Phosphate of. | Refraction, Diaphaneity and Phosphorescence.... | 29 |
| Kiesel Thon: Eisen-oxyd: Manganoxyd. | Structure and Imitative Shapes.... | 34 | Lithomarge, Ferruginous | Lustre and Color... | 57 |
| Kyanite, Prismatic.... | Electricity & Magnetism..... | 15 | Lithomarge..... | Aggregation & Fracture..... | 69 |
| M. | | | Magnesia, Borate of.. | Electricity & Magnetism..... | 36 |
| | | | Magnetoscope, a delicate..... | | |
| | | | Magnesite..... | Aggregation & Fracture..... | 68 |

| NAMES OF MINERALS. | In illustration of | No. | NAMES OF MINERALS. | In illustration of | No. |
|---|-------------------------------------|-----|---|--|-----|
| Malachite, Fibrous.... | Lustre and Color.. | 68 | O. | | |
| Malachite, Pseudomorphous, resembles Red Copper..... | Pseudomorphism. . | 7 | Obsidian..... | Aggregation & Fracture.. | 67 |
| Manganese, Gray Oxid. of..... | Cleavage..... | 4 | Obsidian..... | Lustre and Color... | 49 |
| Manganese, Gray Oxid. of..... | Structure and Imitative Shapes. . | 3 | Opal, common ... | Lustre and Color... | 40 |
| Manganese, Black.... | Structure and Imitative Shapes. . | 24 | Opal, common... | Lustre and Color.. | 114 |
| Marble, Lucullan.... | Taste and Odour.. | 15 | Opal, Precious... | Lustre and Color.. | 112 |
| Marble, Anthraconitic... | Taste and Odour.. | 14 | Oxokerite..... | Taste and Odour... | 19 |
| Margarit..... | Lustre and Color.. | 12 | P. | | |
| Meerschbaum..... | Aggregation & Fracture..... | 16 | Pitchstone..... | Lustre and Color.. | 8 |
| Menelite; Quartz resinite | Structure and Imitative Shapes. . | 19 | Pitchstone..... | Lustre and Color.. | 76 |
| Mica..... | Electricity & Magnetism..... | 14 | Picrosmine..... | Taste and Odour... | 13 |
| Mica..... | Aggregation & Fracture..... | 31 | Pierre grasse..... | Electricity & Magnetism..... | 19 |
| Mica..... | Lustre and Color.. | 53 | Plasma..... | Lustre and Color.. | 24 |
| Mica..... | Cleavage..... | 17 | Platina, Native... | Lustre and Color... | 35 |
| Mica..... | Taste and Odour.. | 12 | Porcelain earth.... | Aggregation & Fracture.. | 20 |
| Mica..... | Scale of Hardness. | 11 | Prismatic Zeolite..... | Twin Crystals.... | 5 |
| Mica, Iron..... | Structure and Imitative Shapes. . | 14 | Prase.. | Lustre and Color.. | 67 |
| Mica, Lithia..... | Lustre and Color.. | 98 | Predazit (Petzholdt) .. | Refraction, Diaphaneity and Phosphorescence .. | 30 |
| Miemite..... | Electricity & Magnetism..... | 7 | Pumice, Glassy .. | Structure and Imitative Shapes. . | 30 |
| Mine de Plomb arenacé | Structure and Imitative Shapes..... | 35 | Pyrites..... | Taste and Odour.. | 17 |
| Mineral Oil, black.... | Aggregation & Fracture..... | 31 | Pyrites, Magnetic..... | Electricity & Magnetism..... | 49 |
| Mineral Oil, yellow.... | Aggregation & Fracture..... | 22 | Pyrites, Magnetic.... | Lustre and Color.. | 27 |
| Mineral Pitch, schlaggy. | Electricity & Magnetism..... | 30 | Pyrites, Radiated..... | Structure and Imitative Shapes. . | 29 |
| Mineral Resin, yellow. . | Electricity & Magnetism..... | 31 | Q. | | |
| Molybdene, Sulphurate of..... | Lustre and Color.. | 33 | Quartz, common..... | Structure and Imitative Shapes. . | 4 |
| Muscovite..... | Structure and Imitative Shapes. . | 10 | Quartz, common..... | Aggregation & Fracture.. | 51 |
| Myelin..... | Aggregation & Fracture..... | 24 | Quartz, common..... | Aggregation & Fracture.. | 62 |
| Myelin..... | Lustre and Color.. | 87 | Quartz, common..... | Lustre and Color.. | 42 |
| N. | | | Quartz, common..... | Refraction, Diaphaneity and Phosphorescence .. | 3 |
| Native Leadstone..... | Electricity & Magnetism..... | 39 | Quartz, common..... | Refraction, Diaphaneity and Phosphorescence .. | 25 |
| Nephrite..... | Aggregation & Fracture..... | 11 | Quartz, common, Quartz Freshwater..... | Aggregation & Fracture..... | 52 |
| Nontronit..... | Aggregation & Fracture..... | 36 | Quartz in the form of fluor-spar..... | Pseudomorphism. . | 9 |
| | | | Quartz in the form of Baryta..... | Pseudomorphism. . | 31 |

| NAMES OF MINERALS. | In illustration of | No. | NAMES OF MINERALS. | In illustration of | No. |
|--|---|-----|---|---|-----|
| Quartz in the form of Anhydrite..... | Pseudomorphism.. | 17 | Senormonts apparatus & Crystals..... | To illustrate the thermotic characters of Minerals. | |
| Quartz covered with crystals of Heavy-Spar | Pseudomorphism.. | 20 | | | |
| Quartz, Smoky..... | Lustre and Color.. | 104 | | | |
| Quartz, Ferruginous... | Lustre and Color.. | 102 | Serpentine in the form of felspar..... | Pseudomorphism.. | 8 |
| Quartz, Ferruginous... | Lustre and Color.. | 103 | Serpentine, Common... | Aggregation & Fracture..... | 47 |
| Quartz, Rose..... | Refraction, Diaphaneity and Phosphorescence... | 96 | Serpentine, Common... | Aggregation & Fracture..... | 58 |
| Quartz, Rose..... | | 5 | Serpentine, Common... | Lustre and Color.. | 117 |
| R. | | | Silver Glance, Hexahedral..... | Aggregation & Fracture..... | 34 |
| Rock Crystal..... | Electricity & Magnetism..... | 26 | Silver, Hexahedral..... | Aggregation & Fracture..... | 42 |
| Rock Crystal..... | Lustre and Color.. | 19 | Silver, Hexahedral..... | Lustre and Color.. | 29 |
| Rock Crystal..... | Scale of Hardness.. | 1 | Silver Horn Ore..... | Aggregation & Fracture..... | 35 |
| Rock Crystal..... | Refraction, Diaphaneity and Phosphorescence... | 2 | Soap, Mountain..... | Lustre and Color.. | 46 |
| Rock Crystal..... | Refraction, Diaphaneity and Phosphorescence... | 11 | Soda. Carbonate of.... | Taste and Odour.. | 1 |
| Rock Wood..... | Lustre and Color.. | 109 | Spar, double refracting.. | Electricity & Magnetism..... | 33 |
| Rock Salt..... | Taste and Odour.. | 3 | Spar, double refracting.. | Refraction, Diaphaneity and Phosphorescence.... | 9 |
| S. | | | Spinel, blue..... | Electricity & Magnetism..... | 24 |
| Sal Ammoniac..... | Taste and Odour.. | 2 | Spinel..... | Pseudomorphism.. | 5 |
| Salt, Hexahedral Rock. | Electricity & Magnetism..... | 1 | Sphene..... | Twin Crystals.... | 2 |
| Salt, Hexahedral Rock. | Cleavage..... | 9 | Stalactite..... | Lustre and Color.. | 37 |
| Saltpetre : Natron..... | Taste and Odour.. | 4 | Steatite : Soapstone... | Aggregation & Fracture..... | 41 |
| Sandstone in the form of Rock salt..... | Pseudomorphism.. | 11 | Stilbite..... | Electricity & Magnetism..... | 16 |
| Scapolite..... | Cleavage..... | 8 | Stilbite..... | Lustre and Color.. | 11 |
| Schiller-spar, Hemiprismatic..... | Lustre and Color.. | 108 | Strontian, Carbonate of. | Electricity & Magnetism..... | 8 |
| Schiller-spar, Hemiprismatic..... | Scale of Fusibility.. | 3 | Sulphate of Barytes ; Hepatite..... | Taste and Odour.. | 16 |
| Schiller-spar, common.. | Lustre and Color.. | 14 | Sulphur, Prismatic.... | Electricity & Magnetism..... | 29 |
| Schorlite..... | Lustre and Color.. | 79 | Sulphur, Prismatic.... | Aggregation & Fracture..... | 19 |
| Semi-Opal..... | Aggregation & Fracture..... | 18 | Sulphur, Prismatic.... | Lustre and Color.. | 78 |
| Semi-Opal..... | Aggregation & Fracture..... | 66 | Sulphur, Prismatic.... | Taste and Odour.. | 9 |
| Semi-Opal..... | Lustre and Color.. | 9 | Sulphur, Prismatic.... | Lustre and Color.. | 83 |
| Semi-Opal..... | Lustre and Color.. | 10 | | | |
| Semi-Opal..... | Lustre and Color.. | 81 | T. | | |
| Semi Opal..... | Lustre and Color.. | 110 | Talc Mica, Prismatic.. | Scale of Hardness.. | 5 |
| Semi Opal..... | Refraction, Diaphaneity and Phosphorescence.... | 7 | Tin stone..... | Twin Crystals.... | 7 |
| | | | Titanium Ore, Prismatic, pyramidal..... | Aggregation & Fracture..... | 8 |

| NAMES OF MINERALS. | <i>In illustration of</i> | No. | NAMES OF MINERALS. | <i>In illustration of</i> | No. |
|--|--|-----|----------------------------|---|-----|
| V. | | | | | |
| Titanium Ore, Prismatic pyramidal..... | Cleavage..... | 3 | Vesuvian | Lustre and Color.. | 7 |
| Toadstone..... | Structure and Imitative Shapes. . . | 32 | Vitriol, Rhomboidal.... | Taste and Odour.. | 6 |
| Toadstone..... | Structure and Imitative Shapes. . . | 33 | W. | | |
| Topas, Prismatic..... | Electricity & Magnetism..... | 37 | Wavellite..... | Structure and Imitative Shapes. . . | 9 |
| Topas, Prismatic..... | Scale of Hardness. | 8 | Whetstone..... | Lustre and Color.. | 44 |
| Topas, Prismatic..... | Refraction, Diaphaneity and Phosphorescence. . . | 13 | Z. | | |
| Topas, Prismatic..... | Lustre and Color.. | 86 | Zeolite, Axifrangible. . . | Electricity & Magnetism. | 17 |
| Tourmaline..... | Electricity & Magnetism. | 35 | Zeolite, Hexahedral. . . | Electricity & Magnetism. | 18 |
| Tourmaline..... | Lustre and Color.. | 120 | Zeolite, Needle..... | Lustre and Color.. | 97 |
| Tourmaline, Rhomboidal | Electricity & Magnetism. | 34 | Zeolite, Needle.... | Scale of Fusibility. | 6 |
| Trachyte..... | Aggregation & Fracture | 53 | Zeolite, Needle..... | Structure and Imitative Shapes. . . | 27 |
| Trachyte..... | Taste and Odour.. | 11 | Zrolite, Needle..... | Structure and Imitative Shapes. . . | 31 |
| Triphane..... | Cleavage. | 16 | Zinc, Sulphuret of. | Lustre and Color.. | 17 |
| Tripoli. | Aggregation & Fracture | 23 | Zinc, Sulphuret of.... | Lustre and Color.. | 80 |
| U. | | | Zinc, Sulphuret of.... | Cleavage..... | 13 |
| Uran Glimmer..... | Lustre and Color.. | 77 | Zinc, Sulphuret of.... | Refraction, Diaphaneity and Phosphorescence . . . | 26 |
| Uran Ochre..... | Lustre and Color.. | 84 | Zoisite | Lustre and Color.. | 47 |



MINERALOGY.

A. PHYSICAL CHARACTERS OF MINERALS.

MINERALS

TO ILLUSTRATE
STRUCTURE AND IMITATIVE SHAPES.

(Columnar, texture.)

- No. 1. CARBONATE OF LIME. (*Phill*).
KALKSPATH. CALCIT. (*Haid*).
CHAUX CARBONATEE. (*Haüy*).
from Töplitz, Bohemia.

(Columnar, texture.)

- No. 2. RED IRON ORE.
ROTHEISENSTEIN.
FER OLIGISTE: *Hæmatite*.
from Tilkeroide in the Hartz.

(Divergent-Columnar, Radiated.)

- No. 3. GRAY OXIDE OF MANGANESE.
MANGANIT. (*Haid*). GRAU-
BRAUNSTEIN (*Hausm*).
ACERDESE. (*Beud*).
from Iblefeld in the Hartz.

(Concentric Columnar.)

- No. 4. COMMON QUARTZ.
GEMEINER QUARZ.
from the Fragrathal, Tyrol.

(In long fibres.)

- No. 5. RED IRON ORE, HAEMATITE.
ROTHEISENSTEIN.
FER OLIGISTE.
from Frgang, Bohemia.

(Fibrous.)

- No. 6. FIBROUS GYPSUM.
FASRIGER GYPS.
CHAUX SULFATEE FIBREUSE.
from Rüdersdorf near Berlin.

(In very thin fibres.)

- No. 7. COMMON ASBESTUS.
ASBEST. (*Werner*).
ASBEST DÜR.
from Greiner in the Tyrol.

(Reticulated, or net-like.)

- No. 8. TIN WHITE COBALT. (*Phillips*).
SPREISKOBALT (*Werner*). SMAL-
TIN (*Haid*).
COBALT ARSENICAL. (*Haüy*).
from Schneeberg in Saxony.

(Stellated, or star-like.)

- No. 9. WAVELLITE. (*Jameson*).
WEAVELIT. (*Werner*).
ALUMINEPHOSPHATE. (*Haüy*).
from Zbirow near Beraun, Bohemia.

(Lamellar.)

- No. 10. MICA.
MUSCOVITE. (*Dana*).
ZWEIAXIGER GLIMMER.
from Tennville in Transylvania.

(Coarse grained.)

- No. 11. CARBONATE OF LIME. (*Phill*).
 KALKSPATH. CALCIT. (*Haid*).
 CHAUX CARBONATEE. (*Haüy*).
from Targas Finland.

(Granular.)

- No. 12. GRANULAR LIMESTONE.
 KORNIGER KALK.
 CALCAIRE SACCHAROIDE.
from Carrara.

(Curved Conchoidal, with radiated texture.)

- No. 13. LAMELLAR HEAVY-SPAR. (*Jameson*).
 KRUMMSCHALIGER SCHWER-
 SPATH. (*Werner*).
 BARYTE SULFATE CRISTAL-
 LISSE. (*Hy*).
from Freiberg.

(Curved Conchoidal.)

- No. 14. IRON MICA.
 EISENGLIMMER.
 FER OLIGISTE ECAILLEUX.
from Sala, Sweden.

(Crystalline, Conchoidal.)

- No. 15. TUNGSTATE OF IRON. (*Phil-
 lips*).
 WOLFRAM. (*Werner*).
 SCHEELIN FERRUGINEUX.
 (*Haüy*).
from Zinnwald in Bohemia.

(Scaly.)

- No. 16. LEPIDOCROKIT. (*Ullmann*).
from Herdorf near Siegen.

(Compact.)

- No. 17. COMPACT HEAVY-SPAR. (*Jameson*).
 DICHTER SCHWERSPATH. (*Werner*).
 BARYTE SULFATE COMPACTE.

(Globular.)

- No. 18. AGATE.
 ACHAT.
from Tefeld Harz.

(Knobby.)

- No. 19. MENILIT.
 QUARTZ RESINITE. (*Leberopal*).
from Menil Montant, near Paris.

(Botryoidal.)

- No. 20. RED IRON-ORE. (*Jameson*).
 ROTHEISENSTEIN. (*Werner*).
 FER OLIGISTE. (*Haüy*).
from Eibenstock in Saxony.

(In joined globules.)

- No. 21. PISIFORM LIMESTONE.
 ERBSENSTEIN. (*Werner*).
 CHAUX CONCRETIONEE CARB.
 (*Globuliforme*).
from Carlsbad.

(Oolitic.)

- No. 22. CLAY IRON STONE.
THONEISENSTEIN.
FER OXYDE ARGILIFERE.
from Aalen, Wurtemberg.

(Lentil shaped.)

- No. 23. CLAY IRON STONE.
THONEISENSTEIN.
FER OXYDE ARGILIFERE.
from Radnitz, Bohemia.

(Reniform.)

- No. 24. BLACK MANGANESE ORE. (*Jam*).
HARTMANGANERZ.
MANGANESE OXYDE.
from Langeberg near Schwarzenberg.

(Stalactitic.)

- No. 25. FIBROUS BROWN HEMATITE.
FASRIGER BRAUNEISENSTEIN.
LIMONITE FIBREUSE.
from Lobenstein in the Russias.

(Shrub shaped.)

- No. 26. ARRAGONITE.
EISENBLUTHE. (*Werner*).
FLOSFERRI.
from Eisenerz in Steyermark.

(Acicular.)

- No. 27. NEEDLE ZEOLITE.
MESOTYPSATH-NATROLITH in
Klingstein.
ZEOLITE EN AIGUILLES.
from Aussig in Bohemia.

(Forming plates.)

- No. 28. OCTOHEDRAL COPPER.
GEDIGEN KUPFER.
CUIVRE NATIF.
from Rheinbrietbadh.

(Cellular.)

- No. 29. RADIATED PYRITES.
STRAHLKIES. (*W.*)
PYRITE RAYONNEE (*Brochant*).
from Bodenmail, Bavaria.

(Porous.)

- No. 30. GLASSY-PUMICE. (*Jameson*).
BIMSTEIN.
LAVE VITREUSE PUMICE.
from the Volcano. (Lapari Island).

(Drusy.)

- No. 31. NEEDLE ZEOLITE.
NADEL-MESOTYP in Basalt.
ZEOLITE in Aiguilles.
from Linz, Rhine.

(Drusy.)

- No. 32. TOADSTONE.
MANDELSTEIN with Zeolite.
PIERRE AMYGDALOIDE.
from Kaiserstahl in Baden.

(Drusy.)

- No. 33. TOADSTONE.
MANDELSTEIN, with green earth
and zeolites.
PIERRE AMYGDALOIDE.
from Far Oer.

(Marbled.)

- No. 34. OTTRELITE IN CLAY SLATE.
KIESEL-THON-EISENOXYD.
MANGANOXYD. WASSER.
from Ottreux in Limburg.

(Marbled.)

- No. 35. ARENACEOUS LEAD ORE.
MINK DE PLOMB ARENACE.
BLEISANDERZ. KNOTEMERZ.
from Commeru in the Eifel.

(Forming a thin cover.)

- No. 36. CHROMATE OF LEAD. (*Phill*).
ROTHBLEIERZ. KALLOCHROM.
(*Hausur*).
PLOMB CHROMATE. (*Hauy*).
from Beresowsk in the Ural.

(Polished by nature.)

- No. 37. TIN WHITE COBALT. (*Phillips*).
SPEISKOBALT.
SMALTIN. (*Haid*). (*Werner*).
COBALT ARSENICAL. (*Hauy*).
from Schneeberg in Saxony.

(Flowery leaved.)

- No. 38. PRISMATIC FELSPAR. (*Jameson*).
FELDSPATH (W.) ORTHOKLAS.
(*Breith*).
ORTHOSK. (*Beud*).
from Brietenbrunn Saxony.

(With corroded surface.)

- No. 39. BASALTIC HORNBLENDE.
BASALTISCHE HORNBLENDE.
(*Werner*).
AMPHIBOLE BASALTIQUE.
from Schima in Bohemia.

(Flowered.)

- No. 40. GALENA.
BLEIGLANZ. (*Werner*).
GALKNE ; PLOMB SULFURE.
(*Hauy*).
from Freiberg in Saxony.

CRYSTALLOGRAPHY.

THE regular forms assumed by minerals are well known under the name of crystals, and the part of mineralogy which refers to it is thence called CRYSTALLOGRAPHY, or a description of Crystals. Each substance usually exhibits a peculiar crystalline form of its own, although occasionally the same substance crystallises in two distinct and incompatible forms, in which case it is said to be *dimorphous*, from (*dis*) twice and (*morphé*) form. Some times also two substances are found having the same crystalline form and they are then said to be *isomorphous*, from (*isos*) like and (*morphe*) form.

Pseudo-morphism (*pseudos*, false, *morphé*, form,) or the occurrence of a mineral in a form not its own, and not obtained by the regular process of crystallisation, occurs in various minerals, and is chiefly owing to external conditions which have limited the direction and extent of the development of the mineral.

MINERALS

TO ILLUSTRATE

PSEUDOMORPHISM.

- | | |
|---|--|
| <p>No. 1. TIN STONE, in the form of felspar. <i>from St. Agnes, Cornwall.</i></p> | <p>No. 3. GYPSUM, in the form of Rock Salt. <i>from Gosling, Upper Austria.</i></p> |
| <p>No. 2. CARBONATE OF LIME, in the form of Gay Lussite. <i>from Sangerhausen, Thuringia.</i></p> | <p>(Assuming the form of Nepheline.) No. 4. LIEBENERIT, (<i>Stotter</i>) in Porphyry. <i>from Predazzo in Tyrol.</i></p> |

- | | |
|--|---|
| <p>No. 5. STREATITE, (taking the form of Spinel). <i>from the Monzoni in South-Tyrol.</i></p> <p>(Assuming the form of Iolite : syn: Dichroite.)</p> <p>No. 6. CHLOROPHYLLITE. (Jackson). <i>from Kuddam, Connecticut.</i></p> <p>(Assuming the form of Red Copper Ore.)</p> <p>No. 7. MALACHITE. <i>from Chessy near Lyons.</i></p> <p>No. 8. SERPENTINE, in the form of Felspar. <i>from Tredazzo, Tyrol.</i></p> <p>No. 9. QUARTZ, in the form of Fluor Spar. <i>from Breonde, Department of the Haute Loire.</i></p> <p>No. 10. HORNSTONE, in the form of Calcite. <i>from Schneeberg, Saxony.</i></p> <p>No. 11. SANDSTONE, in the form of Rock salt. <i>from Geolstein, Eifel.</i></p> <p>No. 12. HEMATITE, in the form of Pyrites. <i>from the Spitzleite in Erzgebirge.</i></p> | <p>No. 13. QUARTZ, in the form of Barytes. <i>from Toplitz Bohemia.</i></p> <p>(With impressions of Barytes.)</p> <p>No. 14. IRON-PYRITES. <i>from Tavistock in Devonshire.</i></p> <p>(Passing into Mica.)</p> <p>No. 15. PRISMATIC ANDALUSITE. (Jameson). <i>from Lienz in Tyrol.</i></p> <p>(Decomposed to brown Iron Ore.)</p> <p>No. 16. HEXAHEDRAL IRON-PYRITES. (Jameson). <i>from Beresowsk, Ural.</i></p> <p>No. 17. QUARTZ, in the form of Anhydrite. <i>from Geyer, Saxony.</i></p> <p>(Assuming the form of Pyroxene.)</p> <p>No. 18. GREEN-EARTH. <i>from the val di Fassa in Tyrol.</i></p> <p>No. 19. CARBONATE OF LIME, in the form of Felspar. <i>from Mambach, Thuringia.</i></p> <p>No. 20. QUARTZ, covering crystals of heavy spar. <i>from Tavistock Devonshire.</i></p> |
|--|---|

MINERALS

TO ILLUSTRATE

TWIN CRYSTALS.

In their primitive forms crystals never present re-entering angles,—but such appearances are not unfrequent when two or more crystals grow as it were out of one base. Sometimes there is a certain degree of symmetry in the way in which individuals of a group collect themselves together, as in the crop-like form, usually assumed by the mineral called staurotide, and usually Twin Crystals as such cases are sometimes called, called also ‘macles,’ exhibit distinct marks of their origin.

TWIN CRYSTALS.

No. 1. AUGITE. (*Jameson*).
GEMMINER AUGIT. (*Werner*).
PYROXENE. (*Haüy*).
from Schöna in Bohemia.

No. 2. SPHERE. (*Haüy*).
SPHKN (*Karsten*) ; TITANIT
(*Klapr*).
from St. Gotthard.

No. 3. GYPSUM.
GYPS.
CHAUX SULFATEE.
from Girgenti, Sicily.

No. 4. CARBONATE OF LEAD.
WEISSBLEIERZ.
PLOMB CARBONATEE.
from Diepenlieden near Aix la Chapelle.

No. 5. PYRAMIDO-PRISMATIC ZEOLITE.
(*Jam*).
HARMOTOM, KREUTZSTEIN.
(*Werner*).
PIKRE CRUCIFORME.
from Andreasberg in the Harz.

No. 6. LEVYNE. (*Brewster*).
from Leipa in Bohemia.

No. 7. TINSTONE.

ZINNSTEIN. (*Werner*).
 ETAIN OXYDE. (*Hauy*).
from Schlackenwalde in Bohemia.

Twin faces (*Miller*.)No. 8. PRISMATIC FELSPAR. (*Jame-son*).

ADULAR. (*Werner*).
 FELDSPATHE. (*Hauy*).
from St. Gotthardt,

No. 9. PRISMATIC FELSPATH. (*Jame-son*).

FELDSPATH. (*W*) ORTHOKLAS.
 (*Breith*).
 ORTHOSE. (*Beud*).
from Hirschberg in Silesia.

No. 10. MAGNETIC IRON.

MAGNETKISEN. (*Werner*).
 FER OXYDUL.
from Greiner, Tyrol.

No. 11. CLEAVELANDITE.

ALBITE, TETARTIN.
from Shezing, Tyrol.

No. 12. PRISMATIC FELSPAR. (*Jame-son*).

ADULAR. (*Werner*).
 FELDSPATHE. (*Hauy*).
from St. Gotthardt.

MINERALS

TO ILLUSTRATE

AGGREGATION AND FRACTURE.

ALTHOUGH by proper management and a skilful hand, by splitting off parallel faces of various thickness or by removing edges or angles which may have replaced faces, it is possible to obtain an ultimate or primitive form of each crystal,—simple minerals are often so constructed and built up of like parts, aggregated as it is termed, as to appear in forms dissimilar to the ultimate or primitive crystals.

When a mineral breaks in a direction different from the cleavage planes it forms fracture surfaces, and the form of the fracture may be *conchoidal, even, uneven, smooth, splintery, hackly, or earthy.*

AGGREGATION.

| (Rhombohedrons aggregated to globular.) | (On Orthoclase.) |
|--|--|
| No. 1. CARBONATE OF LIME. (<i>Phill</i>). KALKSPATH. CALCIT. (<i>Haid</i>). CHAUX CARBONATE. (<i>Haüy</i>). <i>from Maxen near Dresden.</i> | No. 4. CLRAVELANDITE. (<i>Brooke</i>). ALBIT. TETARTIN. (<i>Breithaupt</i>). <i>from Hirschberg in Silesia.</i> |
| (Rhombohedrons aggregated to skalene dodecahedrons.) | (On orthoclase, in regular situation.) |
| No. 2. CARBONATE OF LIME. (<i>Phill</i>). KALKSPATH. CALCIT. (<i>Haid</i>). CHAUX CARBONATE. (<i>Haüy</i>). <i>from Freiberg in Saxony.</i> | No. 5. CLRAVELANDITE. (<i>Brooke</i>). ALBIT. TETARTIN. (<i>Breithaupt</i>). <i>from Hirschberg in Silesia.</i> |
| (Hexahedrons aggregated to dodecahedrons.) | (On Orthoclase.) |
| No. 3. FLUOR SPAR. FLUSSSPATH. CHAUX FLUATE. <i>from Ehrenfriedersdorf, Saxony.</i> | No. 6. CLEAVELANDITE. (<i>Brooke</i>). ALBIT. TETARTIN. (<i>Breithaupt</i>). <i>from Hirschberg in Silesia.</i> |

- No. 7. GRANITE, GRAPHIC.
SCHRIFTGRANIT.
from Zweiesel, Bavaria.

(On Iron glance.)

- No. 8. PRISMATO-PYRAMIDAL-TITANIUM ORE.
RUTIL.
TITANE OXYDE.
from St. Gotthard.

(Joined with Starbide.)

- No. 9. PRISMATIC KYANITE. (*Jameson*).
KYANIT. (*Werner*). KYANITH.
(*Breith*).
DISTHENE. (*Hauy*).
from St. Gotthardt.

FRACTURE.

Very difficult to break by striking with a hammer.)

- No. 10. OCTOEDRAL COPPER.
GEDIENEN KUPFER.
CUIVRE NATIF.
from Katherinenberg in the Ural.

(Very difficult to break by striking with a hammer.)

- No. 11. NEPHRITE.
CERAUNITE.
JADE NEPHRITIQUE. (*Hauy*).
from China.

(Very difficult to break.)

- No. 12. FIGURE-STONE, AXE STONE.
(*James*).
BEILSTEIN. (*Werner*). BILDSTEIN.
TALC GLAPHIQUE.
from Ochsenkopf in Saxony.

(Very difficult to break by the strokes of a hammer.)

- No. 13. COMMON ASBESTUS.
ASBEST GRMEINER.
from Sala, Sweden.

(Very difficult to break by the strokes of a hammer.)

- No. 14. FIBROLITE. (*Bournon*).
FASERKIESEL.
from Bodenmais in Bavaria.

(Difficult to break.)

- No. 15. BASALT.
OLIVIN UND TITANEISEN EINSCHTIESSEND.
from Unkel on the Rhine.

(Difficult to break.)

- No. 16. MEERESCHAUM.
MAGN: CARB: SILICIF: SPONGIEUSE.
ECUME DE MER.
from Natalia.

(Less difficult to break.)

- No. 17. HORNSTONE.
HORNSTEIN.
QUARTZ AGATE GROSSIER.
from Rugen.

(Easily broken.)

- No. 18. SEMI-OPAL.
HALBOPAL.
from Bilin, Bohemia.

(Very easily broken.)

- No. 19. PRISMATIC SULPHUR.
SOUFRE. (*Häüy*).
SCHWEFEL. NATURLICHER.
from Girgenti in Sicilia.

(Friable.)

- No. 20. PORCELAIN-EARTH.
KAOLIN, PORZELLANERDE.
(*Werner*).
FELDSPATH DECOMPOSE.
(*Häüy*).
from Aue in Saxony.

(Flowing with difficulty.)

- No. 21. BLACK MINERAL OIL. (*Jame-
son*).
THERIGES ERDOIL. (*Werner*)
BITUME LIQUID NOIR (*Häüy*)
from Salso in Parma.

(Liquid.)

- No. 22. YELLOW MINERAL OIL. (*Jame-
son*).
GELBES ERDOIL. (*Werner*).
BITUME LIQUIDE JAUNE.
(*Häüy*)
from Miamo in Parma.

(Feeling rough.)

- No. 23. TRIPOLI.
TRIPEL. (*Werner*).
from Meissen Berg near Prague.

(Feeling soft.)

- No. 24. MYRLIN. (*Breith*).
TALKSTEINMARK. (*Freiesleben*).
from Rochlitz in Saxony.

(Feeling greasy.)

- No. 25. RHOMBOIDAL GRAPHITE.
GRAPHIT.
GRAPHITE.
from Ceylon.

(Feeling greasy.)

- No. 26. AGALMATOLITE.
from Saczka, Banat.

(Dissolving in water.)

- No. 27. FULLERS EARTH.
WALKERDE
TERRE A FOULON.
from Reifenstein near Cilly.

(Becoming translucent in water.)

- No. 28. EHRENBURGITE. (*Nöggerath*).
from Drachenfels in the Siebengebirge.

(Writing.)

- No. 29. ROTHSEL. (CLAY MIXED WITH
RED OXYD OF IRON).
from Eiberstock, Saxony.

(Writing.)

- No. 30. BLACK CHALK.
from Osnabruck.

(Elastic.)

- No. 31. MICA.
ZWIRAXIGER GLIMMER.
MUSCOVITE. (*Dma*).
from Miask in the Ural.

(Elastic.)

- No. 32. ELASTIC BITUMEN.
ELATRIT. (*Hausmann*).
BITUME ELASTIQUE. (*Haüy*).
from Castleton in Derby-shire.

(Elastic, sounding.)

- No. 33. GYPSUM.
GYPS,
CHAUX SULFATE.
from Montmartre near Paris.

(Ductile.)

- No. 34. HEXAHEDRAL SILVER-GLANCE.
(*Jameson*).
GLASERZ. (*Werner*). SILBER-
GLANZ. (*Breith*).
ARGENT SULFURE. (*Haüy*).
from Freiberg.

(Ductile.)

- No. 35. SILVER HORN-ORE. (*Jameson*).
HORNERZ. (*Werner*).
ARGENT MURIAT. (*Haüy*).
from Copiapó, Chile.

(Less Ductile.)

- No. 36. NONTRONIT. (*Berthier*).
from Andreasberg in the Harz.

(Ductile.)

- No. 37. OZOKERITE. (*Glocker*).
ERDWACHS.
from Slanik in Moldavia.

(Less Ductile.)

- No. 38. BITUMEN. (*Dana*).
ASPHALT; ERDPECH.
BITUME GLUTINEUX.
from Lobsan, Dpt. of the Bas-Rhin.

(Less Ductile.)

- No. 39. VITREOUS COPPER. (*Jameson*).
KUPFERGLANZ, KUPFERGLAS.
(*Werner*).
CUIVRE SULFURE. (*Haüy*).

(Mild Sextile.)

- No. 40. GALENA. (*Phill*).
BLEIGLANZ. (*Werner*).
PLOMB SULFURE. (*Haüy*).
from Freiberg, Saxony.

(Mild.)

- No. 31. STEATITE. (*Jameson*). SOAP-
STONE.
SPECKSTEIN. (*Werner*). STEA-
TIT.
TALC STEATITE. (*Haüy*).
from Wunsiedel in Bavaria.

(Malleable.)

- No. 42. HEXAHEDRAL SILVER. (*Jameson*).
GEDIEGEN SILBER.
ARGENT NATIF. (*Haüy*).
from Schneeberg, Saxony.

(Flexible.)

- No. 43. AXIFRANGIBLE GYPSUM.
(*James*).
FRAUENEIS. (*Gyps*). (*Werner*).
CHAUX SULFATE. (*Haüy*).
from Eisleben.

(Brittle.)

- No. 44. KEROLITE.
KEROLITH. (*Breith*). HYDRO-
SILICIT. (*Kuh*).
from Frankenstein in Silesia.

(Weak.)

- No. 45. ASPHALT.
BITUME SOLIDE.
from Merthyr Tydvill, Devon.

(Even fracture.)

- No. 46. RIBBON JASPER.
BANDJASPI. *S.*
JASPE RUBANE.
from Lerbach in the Harz.

(Even fracture.)

- No. 47. COMMON SERPENTINE.
SERPENTIN.
OPHIOLITE.
from Reichenstein, Silesia.

(Even and Splintery.)

- No. 48. HELIOTROPE.
HELIOTROP. (*Werner*).
QUARZ AGATHE PONCTUE.
from the East.

(Even fracture.)

- No. 49. GALENA.
BLEISCHWEIF.
PLOMB SULFURE.
from Clausthal.

(Uneven fracture.)

- No. 50. LEPTYNITE. (*Z. Th.*)
HORNFKLS.
from Andreasberg in the Harz.

(Uneven and Splintery.)

- No. 51. COMMON QUARTZ.
GEMKINER QUARZ.
from Freiberg, Saxony.

(Uneven fracture.)

- No. 52. COMMON QUARTZ—FRESHWA-
TER QUARTZ.
GEMKINER QUARZ.
from Muffindorf near Bonn, on the Rhine.

(Uneven fracture.)

- No. 53. TRACHYTE.
TRACHYT.
from der Rosenau in the Siebengebirge.

(Uneven fracture.)

- No. 54. PORCELAIN JASPER.
PORZELLAN-JASPI. (*Werner*).
JASPE PORCELAINK.
from Töplitz.

(Uneven fracture.)

- No. 55. HEXAHEDRAL IRON-PYRITES.
(*Jameson*).
SCHWEFELKIES. (*Werner*).
FER SULFURE. (*Huüy*).
from Traverrella, Piedmond.

(Splintery.)

- No. 56. ALABASTER.
GESSO.
KORNIGER GYPS.
ALABATRE.
from Castellina in Tuscany.

(Splintery fracture.)

- No. 57. ANHYDRITE. (*Jameson*).
ANHYDRIT DICHTER. (*Werner*).
CHAUX SULFATEE ANHYDRE.
(*Hy*).
from Sulz in Neckar.

(Splintery.)

- No. 58. COMMON SERPENTINE.
SERPENTIN.
OPHIOLITE.
from Pfanders, Tyrol.

(Splintery fracture.)

- No. 59. COMPACT FELSPAR.
FELDSTEIN. ADINOLE. HAL-
LEFLINT. PETROSILIX. (*Beud.*)
from Sala Sweden.

(Splintery fracture.)

- No. 60. HORNSTONE.
HORNSTEIN. (*Werner.*)
QUARZ AGATHK GROSSIER.
from Frankenstein in Silesia.

(Splintery.)

- No. 61. COMMON CALCEDONY.
CALZEDON.
CALCKDOINE.
from Oberstein.

(Splintery fracture inclining to Conchoidal.)

- No. 62. COMMON QUARTZ.
GEMKINER QUARZ.
from Zinnwald, Bohemia.

(Conchoidal fracture.)

- No. 63. HORNSTONE. (Brown Coal for-
mation).
HORNSTEIN.
QUARTZ AGATE GROSSIER.
from Rolt near Bonn.

(Conchoidal fracture.)

- No. 64. FLINT.
FEUERSTEIN.
SILEX PYROMAQUE.
from Schonen.

(Conchoidal fracture.)

- No. 65. JASPER.
KUGELJASPIR.
JASPR.
from Kandern in Bad n.

(Conchoidal fracture.)

- No. 66. SEMI OPAL.
HALBOPAL.
from Königswinter on the Rhine.

(Conchoidal fracture.)

- No. 67. OBSIDIAN. (*Werner.*)
OBSIDIENNR.
from the Lipari Islands.

(Conchoidal fracture.)

- No. 68. MAGNESITE. (*Jameson.*)
MAGNESIT, TALKERDE. (*Wer-
ner.*)
MAGNESIECARBONATKE. (*Häuy*)
from Frankenstein in Silesia.

(Earthy fracture.)

- No. 69. LITHOMARGE. (*Freiesleben.*)
STEINMARK. (*Werner.*)
ARGILE LITHOMARGK. (*Häuy.*)
from the Harz.

(Slaty.)

- No. 70. DEVONIAN CLAY-SLATE.
THONSCHIEFER.
ARDOISE.
from Caub on the Rhine.

MINERALS

TO ILLUSTRATE

CLEAVAGE.

MINERALS are found to vary much in the degree of coherence existing among the various parts of which they consist,—and whilst some can with difficulty be broken, others yield to the slightest blow. Even in the same species cohesion varies in different directions and there are certain planes at right angles to which it seems to be at a minimum, so that the mineral separates along or parallel to these planes far more readily than in any other direction. This property is termed Cleavage, and the planes thus formed, Cleavage planes.

CLEAVAGE.

No. 1. FLUOR-SPAR.
FLUSSSPATH.
CHAUX FLUATEE.
from Beer-Alston Devonshire.

No. 2. TUNGSTATE OF IRON. (*Phillips*).
WOLFRAM. (*Werner*).
SCHEELIN FERRUGINEUX.
(*Häuy*).
from Zinnwald in Bohemia.

No. 3. PRISMATO-PYRAMIDAL TITANIUM ORE.
RUTIL.
TITANE OXYDE.

No. 4. GRAY OXIDE OF MANGANESE.
MANGANIT. (*Haid*). GRAUBRAUNSTEIN. (*Hausm*).
ACERDESE. (*Beud*).
from Ihlefeld in the Harz.

No. 5. PRISMATIC FELSPAR. (*Jameson*).
FELDSPATH (W.) ORTHOKLAS.
(*Breith*).
ORTHOSE. (*Beud*).
from Languarrik (Greenland).

No. 6. CRIOLITE.
KRIOLITH, EISSTEIN.
ALUMINE FLUATEE ALCALINE,
from Ivikaet in West Greenland.

- | | |
|--|--|
| <p>No. 7. CUBE SPAR, PRISMATIC GYPSUM. (<i>Jam.</i>) ANHYDRITSPAR, MURIAZIT. (<i>Werner</i>). CHAUX SULFATER ANHYDRE. (<i>Haüy</i>). <i>from Hall, Tyrol.</i></p> <p>No. 8. SCAPOLITE. SKAPOLITH. (<i>Wernerit</i>). <i>from Guljöe, Sweden.</i></p> <p>No. 9. HEXAHEDRAL ROCK-SALT. (<i>Jam.</i>) STEINSALZ. SOUDE MURIATÉE. (<i>Haüy</i>). <i>from Wieliczka.</i></p> <p>No. 10. HEAVY SPAR; BARYTES. SCHWERSPATH; BARYTE. BARYTE SULFATER. <i>from Töplitz, Bohemia.</i></p> <p>No. 11. COMMON BERYL. GEMEINER BERYLL. EMERAUDE; BERIL. <i>from Limoges in Francouid.</i></p> <p>No. 12. GALENA. BLEIGLANZ. (<i>Werner</i>). GALENE; PLOMB SULFURE. (<i>Haüy</i>). <i>from Freiberg in Saxony.</i></p> <p>No. 13. SULPHURET OF ZINC. ZINK BLENDE. ZINC SULFURE. <i>from the Harz.</i></p> | <p>No. 14. CELESTINE. COELESTIN. (<i>Werner</i>). STRONTIANE SULFATE. <i>from Strontian.</i></p> <p>No. 15. CARBONATE OF LIME. (<i>Phill.</i>) KALKSPATH. CALCIT. (<i>Haid.</i>) CHAUX CARBONATÉE. (<i>Haüy</i>). <i>from Borion Westphalia.</i></p> <p>No. 16. TRIPHANE. SPODUMEN. LITHION-SPODUMEN. <i>from Sterling, Massachussets.</i></p> <p>No. 17. MICA. GLIMMER. (<i>Werner</i>). ZWEI- AXIGER. <i>from Zinnwald in Bohemia.</i></p> <p>No. 18. AXIFRANGIBLE GYPSUM. (<i>James</i>). FRAUENEIS. (<i>Gyps</i>) (<i>Werner</i>). CHAUX SULFATER. (<i>Haüy</i>). <i>from Eisleben.</i></p> <p>No. 19. COMMON AMPHIBOLE. HORNBLENDE IN TRACHYTE. AMPHIBOLE COMMON. <i>from Stenzelberg in the Siebengebirge.</i></p> <p>No. 20. ICHTHYOPHTHALMITE. APOPHYLLIT, TESSELLIT. (<i>Brewster</i>). APOPHYLITE. (<i>Haüy</i>). <i>from Andreasberg in the Harz.</i></p> |
|--|--|

MINERALS

TO ILLUSTRATE

MOHS' AND BREITHAUP'T'S DEGREES OF HARDNESS.

THE hardness of minerals, or the power of resisting any attempt to separate their parts, is an important character, and being a purely relative distinction two scales have been formed by *MM. Breithaupt* and *Mohs*, composed of well known minerals of which each preceding one is scratched by those preceding it while the latter does not scratch the former. Mohs' scale reckons ten and Breithaupt's twelve degrees of hardness.

MOHS' AND BREITHAUP'T'S DEGREES OF HARDNESS.

| | |
|---|--|
| <p>(Hardness—1 Breithaupt; 1 Mohs.)</p> <p>No. 5. PRISMATIC TALC MICA. (<i>Jameson</i>). TALK. (<i>Werner</i>). TALC. (<i>Häuy</i>). from Greiner in the Tyrol.</p> | <p>(Hardness—4 Breithaupt; 3 Mohs.)</p> <p>No. 2. CALCITE, (<i>Dana</i>); CALCAREOUS SPAR. KALKSPATH. CHAUX CARBONATEE. from Andreasberg in the Harz.</p> |
| <p>(Hardness—2 Breithaupt; 2 Mohs.)</p> <p>No. 12. GYPSUM. GYPS. CHAUX SULFATEE. from Esleben.</p> | <p>(Hardness—5 Breithaupt; 4 Mohs.)</p> <p>No. 6. FLUOR-SPAR. FLUSS SPATH. CHAUX FLUATEE. from Stallberg, Harz.</p> |
| <p>(Hardness—3 Breithaupt; 2.5 Mohs.)</p> <p>No. 11. MICA. GLIMMER, ZWELAXIGER. (<i>Werner</i>). from Zinnwald in Bohemia.</p> | <p>(Hardness—6 Breithaupt; 5 Mohs.)</p> <p>No. 9. RHOMBOHEDRAL APATITE. (<i>Jameson</i>). APATIT. (<i>Werner</i>). CHAUX PHOSPHATEE. (<i>Häuy</i>). from Arendal Norway.</p> |

20 PHYSICAL CHARACTERS OF MINERALS. DEGREES OF HARDNESS.

(Hardness—7 Breithaupt ;
5·5 Mohs.)

- No. 4. GLASSY ACTINOLITE.
GLASSIGER STRAHLSTEIN.
AMPHIBOLE VITREUX.
from Greiner in the Tyrol.

(Hardness—8 Breithaupt ; 6 Mohs.)

- No. 3. PRISMATIC FELSPAR. (*Jameson.*)
ADULAR. (*Werner.*)
FELDSPATHE. (*Häuy.*)
from St. Gothard.

(Hardness—9 Breithaupt ; 7 Mohs.)

- No. 1. ROCK CRYSTAL.
BERG KRISTALL,
QUARZ HYALIN.
from Järschan in Silesia.

Hardness—10 Breithaupt ; 8 Mohs.)

- No. 8. PRISMATIC TOPAS.
TOPAS. (*Werner.*)
ALUMINE FLUATE SILICURE.
from Villa Rica in Brasil.

(Hardness—11 Breithaupt ; 9 Mohs.)

- No. 7. RHOMBOIDAL CORUNDUM.
(*Jameson.*)
KORUND. DEMANTSPATH.
(*Werner.*)
CORINDON. (*Häuy.*)
from China.

(Hardness—12 Breithaupt ;
10 Mohs.)

- No. 10. OCTOHEDRAL DIAMOND.
DEMANT. (*Werner.*)
DIAMANT. (*Häuy.*)
from Minas Geraes in Brasil.

MINERALS

TO ILLUSTRATE

LUSTRE AND COLOUR.

THE optical property of minerals are such as depend on light and are only observable in its presence. They include Lustre and Colour.

Lustre depends on the nature of the surface of a mineral, which causes light to be reflected in different ways and to a different extent. There are thus various kinds of lustre, Metallic, Vitreous, Resinous, Pearly, Silky, and Adamantine, and many degrees of Lustre as Splendent, Shining, Glistening, Glimmering and Dull.

- Nos. 1—35. *Metallic Lustre and Colours.*
 36—111. *Non-Metallic Colours.*
 112—120. *Tarnish, Dichroism or Polychroism.*
-

METALLIC LUSTRE.

| (Metallic lustre.) | (Sub-metallic lustre.) |
|--|--|
| <p>No. 1. GRAY ANTIMONY ORE. ANTIMONGLANZ. ANTIMOINE SULFURE. <i>from the Caspari-Zeche near Arensburg.</i></p> | <p>No. 3. TUNGSTATE OF IRON. (<i>Phillips</i>). WOLFRAM. (<i>Werner</i>). SCHEELIN FERRUGINEUX. (<i>Hay</i>). <i>from Zinnwald in Bohemia.</i></p> |
| (Metallic lustre.) | (Sub-metallic lustre.) |
| <p>No. 2. IRON PYRITES. SCHWEFELKIES. (<i>Werner</i>). PYRITE. <i>from Traversella in Piedmont.</i></p> | <p>No. 4. COAL HOUILLE. STEINKOHL. BLATTERKOHL. <i>from Essen on the Ruhr.</i></p> |

(Vitreous lustre.)

- No. 5. ROCK CRYSTAL. (*Jameson*).
 BERGKRISTALL.
 QUARZ-HYALIN. (*Häuy*).
from St. Gothard.

(Vitreous lustre.)

- No. 6. CALCITE. (*Dana*); CALCARE-
 OUS SPAR.
 KALKSPATH.
 CHAUX CARBONATÉE.
from Adreasberg in the Harz.

(Resinous lustre.)

- No. 7. VESUVIAN. (*Jameson*).
 VESUVIAN. (*Werner*).
 (FETTGlanz.) IDOKRASE.
 (*Häuy*).
from Vesuvius.

(Resinous lustre.)

- No. 8. PITCHSTONE.
 PECHSTEIN.
 PIKRE DE POIX.
from Buschbad near Meissen.

(Resinous lustre.)

- No. 9. SEMI OPAL.
 HALBOPAL.
from Königswinter on the Rhine.

(Wavy lustre.)

- No. 10. SEMI OPAL.
 HALBOPAL.
from Königswinter on the Rhine.

(Pearly lustre.)

- No. 11. STILBITE. (*Dana*).
 DESMIN. (*Breithaupt*);
 STRAHLKOLITH.
 STILBIT. (*Häuy*)
from Farøe.

(Pearly lustre.)

- No. 12. MARGARIT. (*Fuchs*).
 PERLGLIMMER. (*Mohs*).
from Pfitsch-Thal in Tyrol.

(Pearly lustre.)

- No. 13. GILBERTIT. (*Thomson*).
from St. Just in Cornwall.

(Metallic pearly.)

- No. 14. COMMON SCHILLER-SPAR. (*Jam.*)
 SCHILLERSPATH.
 DIALLAGE METALLOIDE.
from the Baste in the Harz.

(Metallic pearly lustre.)

- No. 15. DIALLAGE (WITH SAUSSURITE).
 BRONZITE.
from Imprunella, Tuscany.

(Silky lustre.)

- No. 16. FIBROUS GYPSUM.
 FASERIGER GYPS.
 CHAUX SULFATÉE FIBREUSE.
from Nordhausen Thuringia.

(Adamantine lustre.)

- No. 17. SULPHURET OF ZINC.
 BLENDE.
 ZINC SULFURE.
from Neudorf, Harz.

(Splendent.)

- No. 18. IRON GLANCE.
 EISENGLANZ.
 FER OLIGISTE.
from Rio, Elba.

(Splendent.)

- No. 19. ROCK CRYSTAL.
 BERGKRISTALL.
 QUARZ HYALIN.
from Järschän in Siberia.

(Shining.)

- No. 20. CELESTINE.
 COELESTIN. (*Werner*).
 STRONTIANK SULFATE.
from Girgenti in Sicilia.

(Glistening.)

- No. 21. CARBONATE OF IRON. CHALY-
 BITK. (*Miller*).
 SPATHEISENSTEIN. SIDERIT.
 (*Haid*).
 FER OXYDE CARBONATE.
 (*Häuy*).
from Lobenstein.

(Glimmering.)

- No. 22. COMMON CALCEDONY.
 CALCEDON.
 CALCEDOINE.
from Island.

(Glimmering.)

- No. 23. HELIOTROPE.
 HELIOTROP. (*Werner*).
 QUARZ AGATHE PUNCTUE.
from the Sria.

(Dull.)

- No. 24. PLASMA. (*Werner*).
 QUARTZ AGATK VERT.
from Ofenburg in Baden.

(Dull.)

- No. 25. STRIPED JASPER.
 BANDJASPIE. (*Werner*).
 JASPER RUBANNE.
from Gmundstein near Altenburg.

METALLIC COLOURS.

*By colour is meant the colour of the
 entire mineral.*

(Copper red.)

- No. 26. OCTOEDRAL COPPER.
 GEDIEGEN KUPFER.
 CUIVRE NATIF.
from the Lizard in Cornwall.

(Bronze yellow.)

- No. 27. MAGNETIC PYRITES. (*Jame-
 son*).
 MAGNETKIES.
 FER SULFURE.
from Bodenmais in Bavaria.

(Brass yellow.)

- No. 28. COPPER PYRITES. (*Phill.*)
 KUPFERKIES. CHALKOPYRIT.
 (*Haid.*)
 CUIVRE PYRITEUX. (*Haüy.*)
from Tavistock, Devonshire.

(Silver white.)

- No. 29. HEXAHEDRAL SILVER. (*Jameson.*)
 GEDIEGEN SILBER.
 ARGENT NATIF. (*Haüy.*)
from Schneeberg, Saxony.

(Silver white.)

- No. 30. AXOTOMOUS ARSENIC PYRITES.
 (*Jameson.*)
 ARSENIKKIES. AXOTOMER.
 (*Mohs.*)
 FER ARSENICAL. (*Haüy.*)
from Reichenstein innesia.

(Gold yellow.)

- No. 31. HEXAHEDRAL GOLD. (*Hy.*)
 GEDIEGEN GOLD. (*Werner.*)
 OR NATIF. (*Haüy.*)
from Veraspatak, Hungary.

(Tin white.)

- No. 32. HEXAHEDRAL COBALT PY-
 RITES.
 GLANZKOBALT. (*Werner.*)
 COBALTE GRIS. (*Haüy.*)
from Tunaberg in Sweden.

(Lead gray.)

- No. 33. SULPHURET OF MOLYBDENA.
 (*Jameson.*)
 MOLYBDAENGLANZ. WASSER-
 BLEI. (*Werner.*)
 MOLYBDENK SULFURE. (*Haüy.*)
from Altenberg in Saxony.

(Lead gray inclining to redish.)

- No. 34. GALENA. (*Phill.*)
 BLEIGLANZ. (*Werner.*)
 PLOMB SULFURE. (*Haüy.*)
from Neudorf, Harz.

(Steel gray.)

- No. 35. NATIVE PLATINA. (*Jameson.*)
 GEDIEGEN PLATIN. (*Werner.*)
 PLATINE NATIF. (*Haüy.*)
from Tagilsk in the Ural.

Nos. 36 to 111.

NON-METALLIC COLOURS.

(Snow white.)

- No. 36. (ARRAGONITE.)
 EISENBLUTHE. (*Werner.*)
 FLOS FERRI.
from Eisenerz in Steyermark.

(Yellowish white.)

- No. 37. STALACTITE.
 KALKSINTER.
 TROPFSTEIN.
from Unkel near Bonn.

(Grayish white.)

- No. 38. GRANULAR LIMESTONE.
KORNIGER KALK.
CALCAIRE SACCHAROIDE.
from Auerbach on the Bergstrasse.

(Greenish white.)

- No. 39. FLUOR-SPAR.
FLUSSSPATH.
CHAUX FLUATEE.
from Freiberg, Saxony.

(Milky white.)

- No. 40. COMMON-OPAL.
GEMEINER OPAL. (*Werner*).
QUARZ RESINITE COMMUN.
from Baumgarten in Silesia.

(Bluish gray.)

- No. 41. COMMON CALCEDONY.
CALZEDON.
CALCEDOINE.
from Oberstein.

(Pearly gray.)

- No. 42. COMMON QUARTZ.
GEMEINER QUARZ.
from Tunaberg.

(Smoke gray.)

- No. 43. FLINT.
FEUERSTEIN.
SILEX PYROMAQUE.
from Schonen.

(Greenish gray.)

- No. 44. WHETSTONE-SLATE.
WETZ SCHIEFER.
SCHISTE COTICULE.
from Sciffersdorf near Freiberg.

(Yellowish gray.)

- No. 45. FLINT.
FEUERSTEIN.
SILEX PYROMAQUE.
from Rügen.

(Ash gray.)

- No. 46. MOUNTAIN SOAP.
BERGSEIFE.
SAVON DE MONTAGNE.
from Kusterschütz in the Mittelgebirge.

(Ash gray.)

- No. 47. ZOISITE. (*Jameson*).
ZOISIT. (*Werner*).
EPIDOTE. (*Hauy*).
from Gefrees in Bavaria.

(Grayish black.)

- No. 48. BASALTE.
BASALT.
from Linz, Rhine.

(Velvet black.)

- No. 49. OBSIDIAN. (*Werner*).
OBSIDIENNE.
from the Lipari Islands.

(Greenish black.)

- No. 50. HORNBLÉNDE. (*Werner*).
 AMPHIBOLE. (*Häuy*).
from Pargas Finland.

(Greenish black.)

- No. 51. HORNBLÉNDE. (*Werner*).
 AMPHIBOLE. (*Häuy*).
from Arendal, Norway.

(Brownish black.)

- No. 52. BROWN-COAL. (*Jameson*).
 BRAUNKOHL. (*Werner*).
 HOUILLE BRUN. (*Häuy*).
from Töplitz.

(Brownish black.)

- No. 53. MICA.
 MUSCOVITE. (*Dana*).
 ZWEIFAXIGER GLIMMER.
from Miask in the Ural.

(Bluish black.)

- No. 54. OXIDE OF COBALT.
 ERDKOBALT.
 COBALT OXYDE.
from Saalfeld in Thüringia.

(Azure blue.)

- No. 55. BLUE COPPER ORE.
 KUPFERLASUR. (*Werner*).
 AZURITE. (*Beudant*).
from Moldawa, Bauat,

(Violet blue.)

- No. 56. AMETHYST.
 AMETHYST.
 QUARZ HYALIN VIOLET.
from Oberstein.

(Lavender blue.)

- No. 57. FERRUGINOUS LITHOMARGE.
 EISENSTEINMARK. (*Freiesleben*).
from Planitz near Zwickau.

(Prussian blue.)

- No. 58. PRISMATIC KYANITE. (*Jameson*).
 ZYANIT. (*Werner*). KYANIT.
 (*Breith*).
 DISTHENE. (*Häuy*).
from Greiner in the Tyrol.

(Smalte blue.)

- No. 59. COMMON CALCEDONY.
 CALZEDON.
 CALCEDOINE.
from Trestyan, Transylvania.

(Smalte blue.)

- No. 60. ANHYDRITE. (*Jameson*).
 ANHYDRIT DICHTER (*Werner*).
 CHAUX SULFATE ANHYDRE
 (*Häuy*).
from Sulz, on the Neckar.

(Indigo blue.)

- No. 61. EARTHY BLUE IRON (*Jameson*).
 BLAUEISNERDE (*Werner*).
 FER PHOSPHATE TERREUX
 (*Häuy*).

(Indigo blue.)

- No. 62. INDIGO COPPER.
KUPFERINDIG. (*Breithaupt*).
COVELLINE. (*Beudant*).
from Donzbach near Dillenburg in Nassau.

(Sky blue.)

- No. 63. BLUE COPPER.
KUPFERLASUR. (*Werner*).
AZURITE. (*Beudant*).
from Rhein-breitbach.

(Verdigris green.)

- No. 64. SILICO-CARBONATE OF COPPER
(*Thomson*). On heavy spar.
CHRYSOCOLLA. KIESELKUPFER.
from Salfeld, Thuringia.

(Celandrine green.)

- No. 65. GREEN EARTH.
GRUNERDE.
TERRE VERTE.
from Monte Baldo near Verona.

(Mountain green.)

- No. 66. NOBLE BERYL.
EDLER BERYLL. (*Werner*).
EMERAUDE. (*Jameson*).
from Nertschink, Siberia.

(Leek green.)

- No. 67. PRASE. (*Jameson*).
PRASEM. (*Werner*).
QUANZ HYALIN VERT OBSCUR.
(*Häuy*).
from Brietenbrann, Saxony.

(Emerald green.)

- No. 68. FIBROUS MALACHITE.
MALACHIT FASRIGER. (*Werner*).
CUIVRE CARBONATE VERT
SOYEUX. (*Häuy*).
from Katherinenburg in the Ural.

(Apple green.)

- No. 69. CHRYSOPRASE.
from Frankenstein, in Silesia.

(Grass green.)

- No. 70. GLASSY ACTINOLITE.
GLASIGER STRAHLSTEIN.
AMPHIBOLE VITREUX.
from Greiner in the Tyrol.

(Grass green.)

- No. 71. GREEN PHOSPHATE OF LEAD.
GRUNBLEIERZ (*Werner*)
PLOMB PHOSPHATE VERT.
(*Häuy*).

(Pistachio green.)

- No. 72. PRISMATOIDIAL AUGITE.
(*Jameson*).
PISTACIT (*Werner*).
EPIDOTE (*Häuy*).
from Arendal, Norway.

(Asparagus green.)

- No. 73. CONCHOIDAL APATITE. (*Jameson*).
SPARGELSTEIN (*Werner*).
CHAUX PHOSPHATE (*Häuy*).
from Greiner in the Tyrol.

(Blackish green.)

- No. 74. COCCOLITE. (*Jameson*).
 KOKKOLITH. (*Werner*).
 PYROXENE GRANULOKUX.
from Arendal in Noruegia.

(Oil green.)

- No. 75. CHRYSOLITE (*Phillips*).
 OLIVIN.
 PERIDOT GRANULIFORME.
 (*Häuy*).
from Dreis in the Eifel.

(Oil green.)

- No. 76. PITCHSTONE.
 PECHSTEIN.
 PIERRE DE POIX.
from Buschbad near Meissen.

(Siskin green.)

- No. 77. URANITE.
 URAN GLIMMER.
 KALKHALTIGER.
from Fohann Georgenstadt, Saxony.

(Sulphur yellow.)

- No. 78. PRISMATIC SULPHUR.
 SCHWEFEL, NATURLICHER.
 SOUFRE (*Häuy*).
from Girgenti in Sicilia.

(Straw yellow.)

- No. 79. SCHORLITE. (*Jameson*).
 PIKNIT. (*Werner*).
 PICKNITE. (*Häuy*).
from Altenberg in Saxony.

(Wax yellow.)

- No. 80. SULPHURET OF ZINC.
 BLENDE.
 ZINC SULFURE.
from Kapnik, Hungary.

(Honey yellow.)

- No. 81. SEMI OPAL.
 HALBOPAL.
from Libethen, Hungary.

(Honey yellow.)

- No. 82. HONEYSTONE. (*Jameson*).
 HONIGSTEIN. (*Werner*).
 MELLITE. (*Häuy*).
from Artern in Thüringen.

(Lemon yellow.)

- No. 83. PRISMATOIDAL SULPHUR.
 (*Jameson*).
 GELBES RAUSCHGELB. (*Werner*).
 ARSENIC SULFURE JAUNE.
 (*Häuy*).
from Persia.

(Lemon yellow.)

- No. 84. URAN-ÖCHRE. (*Jameson*).
 URANOCKER. (*Werner*).
from Joachimsthal in Bohemia.

(Ochre yellow.)

- No. 85. IRON-ÖCHRE.
 EISENOCKER.
 FER OXIDE TERREUX.
from Elba.

(Wine yellow.)

- No. 86. PRISMATIC TOPAS. (*Jameson*).
 TOPAS. (*Werner*).
 ALUMINE FLUATE SILICEUSE.
 (*Haüy*).
from the Schneckenstein in Saxony.

(Cream yellow.)

- No. 87. MYELIN. (*Breith.*)
 TALKSTEINMARK. (*Freissleben*).
from Rochlitz in Saxony.

(Orange yellow.)

- No. 88. PYRAMIDAL LEAD-SPAR.
 (*Jameson*).
 GELBBLEIERZ. (*Werner*).
 PLOMB MOLYBDATE. (*Haüy*).
from Bleiberg in Carinthia.

(Aurora red.)

- No. 89. CHROMATE OF LEAD (*Phill.*).
 ROTHBLEIERZ KALLOCHROM
 (*Hausm.*)
 PLOMB CHROMATE. (*Haüy*).
from Beresowsk in the Ural.

(Hyacinth red.)

- No. 90. HYACINTH. (*Werner*).
 HYACINTE.
from Ceylon.

(Brick red.)

- No. 91. STILBITE. (*Haüy*).
 FOLIATED ZEOLITE. (*Jameson*).
 BLATTER-ZEOLITH. (*Werner*).
from Val di Fassa in the Tyrol.

(Scarlet red.)

- No. 92. PRISMATIC RHOMBOIDAL RUBI-
 BLEND.
 ZINNOBER (*Werner*).
 MERCURE SULFURE (*Haüy*).
from Wolfstein, Rhinish Bavaria.

(Blood red.)

- No. 93. PYROPE.
 GRENAT ROUGE DU FEU.
from Meronitz in Bohemia.

(Flesh red.)

- No. 94. PRISMATIC FELSPAR. (*Jameson*).
 FELDSPATH. (*W.*) ORTHOKLAS.
 (*Breith.*)
 ORTHOSE. (*Beud.*).
from Hirschberg in Silesia.

(Carmine red.)

- No. 95. DODCAHEDRAL CORUNDUM.
 (*Jameson*).
 SPINEL. (*Werner*).
 SPINELLE. (*Haüy*).
from Ceylon.

(Rose red.)

- No. 96. ROSE QUARTZ.
 ROSENQUARZ.
 QUARZE ROSE,
from Rabenstein in Bavaria.

(Rose red.)

- No. 97. NEEDLE ZEOLITE.
 MESOTYPSPATH. Natrolith in
 Klingstein.
 ZEOLITE EN AIGUILLES.
from Aussig in Bohemia.

(Peach blossom red.)

- No. 98. LEPIDOLITE, LITHIA MICA.
LEPIDOLITH, LITHIONGLIM-
MER.
from Rozena near Kraditz in Moravia.

(Peach blossom red.)

- No. 99. RED COBALT OCHRE. (*Jameson*).
KOBALTBESCHLAG (*Werner*).
COBALTE ARSENIATE PULVERU-
LENT. (*Häuy*).
from Schneeberg.

(Columbine red.)

- No. 100. PRECIOUS-GARNET ; IRON-
GARNET (*Dana*).
EDLER GARNAT.
ALMANDINE (*Beudant*).
from Greenland.

(Cherry red.)

- No. 101. PRISMATIC ANTIMONY-
BLENDE, (*James*).
ROTHSPIEGELERZ (*Werner*).
ANTIMOINE OXYDE SULFURE.
(*Häuy*).
from Bräunsdorf near Freiberg.

(Brownish red.)

- No. 102. FERRUGINOUS QUARTZ. (*Dana*).
EISENKIESEL. (*Werner*).
QUARTZ HYALIN HEMATOIDE ;
SINOPE.
from Schellerhau in Saxony.

(Reddish brown.)

- No. 103. FERRUGINOUS QUARTZ (*Dana*).
EISENKIESEL. (*Werner*).
QUARTZ HYALIN HEMATOIDE ;
SINOPE.
from Schellerhau in Saxony.

(Clove brown.)

- No. 104. SMOKY QUARTZ.
RAUCH-QUARTZ ; BERGKRYS-
TALL.
QUARTZ HYALIN ENFUME.
from St. Gotthard.

(Hair brown.)

- No. 105. YELLOW HYDRATED OXIDE OF
IRON.
GELBEISENSTEIN.
FER OXYDE HYDRATE JAUNE.
from Klein Schmalkalden.

(Chestnut brown.)

- No. 106. JASPER (*Jameson*)
JASPI (*Werner*)
QUARTZ JASPE. (*Häuy*).
from Cairo.

(Yellowish brown.)

- No. 107. HORNSTONE.
HORNSTEIN.
QUARTZ AGATE GROSSIER.
from Schneeberg Saxony.

(Pinchbeck brown.)

- No. 108. **HEMIPRISMATIC SCHILLER-
SPAR.** (*Jam.*)
BLATTRIGER ANTHOPHILIT.
(*Werner*).
**DIALLAG METALLOIDE. BRON-
ZIT.** (*Haüy*).
from Kupferberg in Bavaria.

(Wood brown.)

- No. 109. **ROCK-WOOD.**
BERGHOLZ. (*Werner*).
BOIS DE MONTAGNE.
from Sferzing in the Tyrol.

(Liver brown.)

- No. 110. **SEMI OPAL.**
HALBOPAL.
from Bilin in Bohemia.

(Blackish brown.)

- No. 111. **BROWN-COAL.** (*Jameson*).
BRAUNKOHL. (*Werner*).
HOUILLE BRUN. (*Haüy*).
from Töplitz.

Nos. 112 to 120.

TARNISH. DICHROISM.

Under the term of Iridescence may be included a play or change of colours, opalescence, iridescence and tarnish, with other peculiarities often very remarkable and well distinguishing certain minerals.

(Play of colour.)

- No. 112. **PRECIOUS OPAL.**
EDLER OPAL.
QUARZ RESINITE OPALIN.
from Czerwenitz in Hungary.

(Play of colour.)

- No. 113. **LABRADOR FELSPAR.** (*Jameson*).
LABRADOR. (*Werner*).
FELDSPATH OPALIN. (*Haüy*).
from Labrador.

(Opalescence.)

- No. 114. **COMMON-OPAL.**
GEMEINER OPAL. (*Werner*).
QUARZ RESINITE COMMUN.
from Baumgarten in Silesia.

(Iridescence.)

- No. 115. **AVANTURINE FELSPATHIC.**
**SUNSTONE FELSPATHIC SON-
NENSTEIN.**
from Tweedstrand in Norway.

(Painted.)

- No. 116. **ARRAGONITE.**
SPRUDELSTEIN.
CHAUX CONCRETIONEE.
from (Carlsbad).

(With veins.)

No. 117. COMMON SERPENTINE.
SERPENTIN.
OPHIOLITE.
from Zöblitz in Saxony.

Polychroism is a property belonging to some prismatic crystals, presenting a different colour in different directions. The term dichroism is sometimes used, the colours occurring only in two directions, as in Iolite, hence called Dichroite.

(Dichroism.)

No. 118. PRISMATOIDIAL AUGITE.
(*Jameson*).
PISTACIT. (*Werner*).
EPIDOTE (*Haily*).
from Dauphine.

(Dichroism.)

No. 119. IOLITE.
CORDIERITE.
DICHROITE.
from Haddam, Connecticut.

(Dichroism.)

No. 120. TOURMALINE.
EDLER TURMALIN.
TOURMALINE.
from St. Pietro, in Elba.

MINERALS

TO ILLUSTRATE

DIAPHANEITY, REFRACTION AND PHOSPHORESCENCE.

TRANSPARENCY is the property which many substances possess of transmitting light, and such are termed transparent ; semi-transparent ; translucent ; sub-translucent and opaque, according to the quantity of light transmitted.

Nos. 1 to 8.

DIAPHANEITY.

(Transparent.)

No. 1. AXIFRANGIBLE GYPSUM.

(James.)

FRAUENEIS. (Gyps). (Werner).

CHAUX SULFATEE. (Hy).

from Eisleben.

(Transparent.)

No. 2. ROCK-CRYSTAL. (Jameson.).

BERGKRISTALL.

QUARZ-HYALIN. (Häuy).

from St. Gotthardt.

(Translucent.)

No. 3. COMMON QUARTZ.

GEMEINER QUARZ.

from Freiberg, Saxony.

(Translucent.)

No. 4. CALCITE. (Dana); CALCAREOUS
SPAR.

KALKSPATH.

CHAUX CARBONATEE.

from Andreasberg in the Hartz.

(Translucent.)

No. 5. ROSE QUARTZ.

ROSENQUARZ.

QUARZ ROSE.

from Rabenstein in Bavaria.

(Semi-translucent.)

No. 6. ALABASTER

GESSO. KORNIGER GYPS.

ALABATRE.

from Castellina in Tuscany.

(Semi-translucent.)

No. 7. SEMI OPAL.

HALBOPAL.

from Libellthen, Hungary.

(Semi-translucent.)

- No. 8. FLINT.
 FUERSTEIN.
 SILEX PYROMAQUE.
from Reigen.

Nos. 9 to 24.

REFRACTION.

A ray of light proceeding from any object and passing from any one medium or transparent substance to another is more or less bent out of its original direction and this bending is called refraction. But when a ray of light passes through certain minerals it is separated into two parts, each part undergoing a different refraction and ultimately emerging by itself. An object seen through such a mineral is seen double, and the phenomena is called double refraction.

(Refractive and polarising.)

- No. 9. DOUBLE REFRACTING SPAR.
 DOPPELSPATH.
 CHAUX CARBONATEE.
from the Eastern Coast Islands.

(Refractive.)

- No. 10. ARRAGONITE.
 ARRAGONIT. (*Hg.*)
from Bilin in Bohemia.

(Refractive.)

- No. 11. ROCK CRYSTAL. (*Jameson*).
 BERGKRISTALL.
 QUARZ-HYALIN. (*Hauy*).
from St. Gotthardt.

(Refractive.)

- No. 12. NOBLE BERYL.
 EDELER BERYLL. (*Werner*).
 EMERAUDE. (*Jameson*).
from Nertschink, Siberia.

(Refractive.)

- No. 13. PRISMATIC TOPAS.
 TOPAS. (*Werner*).
 ALUMIN FLUATE SILICENSE.
from Villa Rica in Brasil.

(Refractive.)

- No. 14. FLUOR-SPAR.
 FLUSSPATH.
 CHAUX FLUATEE.
from Bear Ashton, Devonshire.

(Refractive.)

- No. 15. PRISMATIC FELS-PAR. (*Jameson*).
 ADULAR. (*Werner*).
 FELDSPATH. (*Hauy*).
from St. Gotthardt.

(Refractive.)

- No. 16. DIOPSIDE.
 DIOPSID.
from Rothenkopf, Tyrol.

(Tarnished by passing in brown Iron ore.)

- No. 17. IRON GLANCE.
 EISENGLANZ.
 FER OLIGISTE.
from Rio, Elba.

(Tarnished.)

- No. 18. IRON GLANCE.
EISENGLANZ.
FER OLIGISTE.
from Rio, Elba.

(Tarnished.)

- No. 19. HEXAHEDRAL IRON-PYRITES.
(*Jameson*).
SCHWEFELKIES. (*Werner*).
FER SULFURE. (*Häuy*).
from Santa fe de Bogota.

(Tarnished.)

- No. 20. OCTAHEDRAL BISMUTH.
(*James*).
GEDIEGEN WISMUTH. (*Werner*).
BISMUTH NATIF. (*Häuy*).
from Schneeberg, Saxony.

(Tarnished.)

- No. 21. NATIVE ARSENIC.
GEDIEGEN ARSENIK. (*Werner*).
ARSENIC NATIF. (*Häuy*).
from Andreasberg in the Harz.

(Tarnished.)

- No. 22. VARIEGATED COPPER.
BUNKUPFERERZ. (*Werner*).
CUIVRE PYRITEUX HEPATHIQUE. (*Häuy*).
from Lautenberg in the Harz,

(Tarnished.)

- No. 23. ALLOPHANE.
ALLOPHAN (STROMEIER).
from Saalfeld, Thuringia.

(Tarnished.)

- No. 24. FOLIATED COAL.
BLATTERKOHLE.
HOUILLE FRULLETE.
from Waldenburg Silesia.

Nos. 25 to 30.

PHOSPHORESCENCE.

The property of remitting light, either by friction or when gently heated, is called phosphorescence and is possessed by several minerals.

(Evolving light by friction.)

- No. 25. COMMON QUARTZ.
GEMEINER QUARZ.
from Freiberg, Saxony.

(Phosphorescent by friction.)

- No. 26. SULPHURET OF ZINC.
BLENDE.
ZINC SULFURE.
from Kaprik, Hungary.

(Phosphorescent by friction.)

- No. 27. AMPHIBOLE FIBREUX.
TREMOLITH. (*Werner*).
from St. Gothard.

(Phosphorescent by means of heat.) (Phosphorescent by means of heat.

No. 28. FLUOR SPAR.
FLUSSSPATH.
CHAUX FLUATÉE,
from Tavistock, Devonshire.

No. 30. PREDAZZIT. (*Petzhold*).
from Predazzo in the Tyrol.

INSTRUMENTS.

(Phosphorescent by means of heat.)

No. 29. PHOSPHATE OF LIME.
PHOSPHORIT. (*Werner*).
CHAUX PHOSPHATE.
from Logresan in Estremadura.

A delicate Electroscope.
A delicate Magnetoscope.
Senarmont's apparatus and crystals to illustrate the thermotic characters of minerals.

MINERALS

TO ILLUSTRATE

TASTE AND ODOUR.

Nos. 1 to 7.

TASTE.

(Alkaline taste.)

No. 1. CARBONATE OF SODA.
from Chile.

No. 2. OCTAHEDRAL SALT-AMMONIAC.
(*Jam.*)
SALMIAC. (*Werner*).
AMMONIAQUE MURIATEE.
(*Haüy*).
from Vesuvius (Eruption of 1834.)

(Saline taste.)

No. 3. ROCK-SALT.
STEINSALZ. (*Werner*).
SOUDE MURIATE.
from Hall in Württenberge.

(Cooling.)

No. 4. NATRON, SALTPETRE.
SOUDE NITRATEE. (*Haüy*).
from Chile.

(Sweetish astringent.)

No. 5. ALUNOGENE. (*Beudant*).
KERAMOHALIT. (*Glocker*).
from Schemnitz.

(Metallic astringent.)

No. 6. RHOMBOIDAL VITRIOL. (*Jam*).
FER SULFATE. (*Haüy*).
EISENVITRIOL. (*Werner*).
from Rammelsberg near Goslar in the Hartz.

(Bitter saline taste.)

No. 7. EPSOM SALT.
from Idria.

Nos. 8 to 20.

ODOUR.

(Bituminous odour.)

No. 8. ASPHALT.
BITUME SOLIDE.
from Limmer near Hanover.

(Sulphureous odour.)

No. 9. PRISMATIC SULPHUR.
SCHWEFELD, NATURLICHER.
SOUFRE.
from Wenzel, Hanover.

(Argillaceous odour.)

No. 10. CLAY.
from Lenz near Bonn on the Rhine

38 PHYSICAL CHARACTERS OF MINERALS. TASTE AND ODOUR.

(Argillaceous odour.)

- No. 11. TBACHYTR.
from Berkum near Bonn.

(Argillaceous odour.)

- No. 12. MICA.
GLIMMER. (*Werner*). ZWEI-
AXIGER.
from Zinnwald in Bohemia.

(Bitter Argillaceous odour.)

- No. 13. PIKROSMINE.
PIKROSMIN. (*Heidinger*).
from Zöblitz in Saxony.

Fetid bituminous (by friction.)

- No. 14. ANTHRACONITE.
from Andarum, Schönen.

Fetid bituminous (by friction.)

- No. 15. ANTHRACONITE. (*Lucullan*).
from Sundaland.

Fetid bituminous (by friction.)

- No. 16. HEPATIT. (Sulphate of Barytes.)
from Andrarum, (Schönen.)

Sulphureous odour (by friction.)

- No. 17. PYRITES.
SCHWEFELKIES.
FER SULFURE. (*Häuy*).
from Marienberg near Bonn.

Alliaceous odour (by friction.)

- No. 18. PRISMATIC ARSENICAL PY-
RITES. (*Jameson*).
ARSENIKKIES. (*Werner*).
FER ARSENICAL. (*Häuy*).
from Freiberg.

(Aromatic odour.)

- No. 19. OZOKERITE.
ERDWACHS.
OZOKERIT. (*Glocker*).

(Horseradish odour.)

- No. 20. SELENIURET OF LEAD.
SELENBLI. CLAUSTHALIT.
(*Haid*).
SELENIURE DE PLOMB.
from Tilkeroode in the Harz.

MINERALS

TO ILLUSTRATE

ELECTRICITY AND MAGNETISM.

No. 1 to 28 becoming + electr. by friction. No. 33 to 38 electr. by heat.
 No. 29 to 32 becoming — electr. by friction. No. 39 to 50 Magnetism.

Becoming + electr. by friction, viz.

No. 1 to 28—*Becoming positive electric, by friction.*

No. 1. HEXAHEDRAL ROCK-SALT.
 (Jam).
 STEINSALZ.
 SOUDE MURIATEE. (Häuy).
from Wieliczka.

No. 2. GYPSUM.
 GYPS.
 CHAUX SULFATÉE.
from Montmartre, near Paris.

No. 3. ANHYDRITE. (Jameson).
 ANHYDRIT DICHTER. (Werner).
 CHAUX SULFATÉE ANHYDRE.
 (Häuy).
from Sulz a Neckar.

No. 4. FLUOR-SPAR.
 FLUSSSPATH.
 CHAUX FLUATÉE.
from Derbyshire.

No. 5. ARAGONITE.
 ARAGONIT. (Häuy).
from Bilin in Bohemia.

No. 6. CARBONATE OF LIME. (Phill.).
 KALSPATH-CALCIT. (Haid.).
 CHAUX CARBONATÉE. (Häuy).
from Auerbach-Saxony.

No. 7. MISMIT. *from Tuscany.*

No. 8. CARBONATE OF STRONTIAN.
 STRONTIANIT.
 STRONTIANE CARBONATÉE.
from Hamm in Westphalia.

No. 9. CARBONATE OF BARYTES.
 WITHERIT (Werner).
 BARYTE CARBONATÉE. (Häuy).
from Alston in Cumberland.

- No. 10. HEAVY SPAR ; BARYTES.
SCHWERSPATH ; BARYTE.
BARYTE SULFATEE,
from Freiberg in Saxony.
- No. 11. CELESTINE.
CORLESTIN. (Werner).
STRONTIANE SULFATEE.
from Strontian.
- No. 12. CARBONATE OF LEAD.
WEISSBLIEZ.
PLOMB CARBONATE.
*from the Grabe Kurfürst Ernst of
Boenkhausen near Arensburg.*
- No. 13. CALAMINE.
GALMEI. ZINKSPATH.
ZINC CARBONATE (Häuy).
from Dagdnadzka, Banat.
- No. 14. MICA.
ZWEIAXIGER GLIMMER.
MUSCOVITE. (Dana).
from Miask in the Ural.
- No. 15. PRISMATIC KYANITE. (Jameson).
ZYANIT. (Werner). KYANIT
(Breith.).
DISTHENE. (Häuy).
from Greiner in the Tyrol.
- No. 16. STILBITE. (Dana).
DESMIN. (Breithaupt) ; STRAHL-
ZEOLITH.
STILBIT. (Häuy) PARTIM.
from Farøe.
- No. 17. AXIFRANGIBLE ZEOLITE.
(Jameson).
ICHTHIOPHTHALM (Werner).
APOPHILLITE. (Häuy).
from the Seisser-Alp in the Tyrol.
- No. 18. HEXAHEDRAL ZEOLITE. (Jameson).
ANALZIM. (Werner).
ANALCIME. (Häuy).
from the Seisser-Alp in the Tyrol.
- No. 19. ELÆOLITH.
PIERRE GRASSE.
from Brenig in Norway.
- No. 20. PRISMATIC FELSPAR, (Jameson).
ADULAR. (Werner).
FELDSPATHE. (Häuy).
from St. Gotthardt.
- No. 21. BASALTIC HORNBLENDE.
BASALTISCHE HORNBLENDE
(Werner).
AMPHIBOLE BASALTIQUE.
from Schima in Bohemia.
- No. 22. AUGITE. (Jameson).
GEMEINER AUGIT. (Werner).
PYROXENE (Häuy).
from Schima in Bohemia.
- No. 23. EPIDOTE (Häuy).
PISTACIT. THALLIT. (Hausm.).
from Arendal in Norway.

- No. 24. BLUE SPINELL.
BLAUER SPINELL.
SPINELLE BLUE.
from Aoker in Sweden.
- No. 25. IOLITE.
CARDISRITE.
DICHROIT. STEINHEILIT, PE-
LIOM.
from Orijarfvi Einnland.
- No. 26. ROCK CRYSTAL.
BERGKRISTALL.
QUARZ HYALIN.
from Jarischau in Silesia.
- No. 27. EGERANE. (VAR: from Vesu-
vius.)
ÉGERAN (Werner).
from Haslan near Eger in Böhemia.
- No. 28. PRECIOUS GARNET; IRON-GAR-
NET (Dana).
EDLER GRANAT.
ALAMANDINE (Beudant).
from Greenland.

MINERALS NEGATIVE ELEC- TRIC BY FRICTION.

(Negative electric by friction.)

- No. 29. PRISMATIC SULPHUR.
SCHWEFELD, NATURLICHER,
SOUFRE. (Haüy).
from Girgenti in Sicily.

(Negative electric by friction.)

- No. 30. SCHLAGGY MINERAL PITCH.
(Jameson).
SCHLACKIGES ERDPECH. (Wer-
ner).
BITUME SOLIDE. (Haüy).
from Asphalte lake.

(Negative electric by friction.)

- No. 31. YELLOW MINERAL-RESIN
(Jameson).
BERNSTEIN. (Werner).
SUCCIN. (Haüy).
from the shores of the Indian Ocean.

(Negative electric by friction.)

- No. 32. HONEYSTONE. (Jameson).
HONIGSTEIN. (Werner).
MELLITE. (Haüy).
from Artern in Thuringia.

(Positive electric by compression.)

- No. 33. DOUBLE REFRACTING SPAR.
DÖPPELSPATH.
CHAUX CARBONATE.
from the Island of the Eastern Coast

(Polar electric by heat.)

- No. 34. RHOMBOIDAL TOURMALINE.
(Werner).
SCHORL, TOURMALIN. (Werner).
TOURMALINE. (Haüy).
from Elba.

(Polar electric by heat.)

- No. 35. TOURMALINE.
EDLER TURMALIN.
TURMALINE.
from St. Pietro and Elba.

(Polar electric by heat.)

- No. 36. BORATE OF MAGNESIA.
BORACIT.
MAGNESIE BORATRE. (*Häuy*).
from Kalkberg near Lüneburg.

(Polar electric by heat.)

- No. 37. PRISMATIC TOPAS.
TOPAS. (*Werner*).
ALUMINE FLUATÉE SILICEUSE.
from Villa Rica in Brasil.

(Polar electric by heat.)

- No. 38. ELECTRIC CALAMINE. (*Dana*).
KIESELGALMEI. (*V. Kob*);
ZINKGLAS. (*Hausm*).
ZINC SILICATE. (*Dufrénoy*).
from Altenberg near Aachen.

(Magnetic minerals.)

- No. 39. NATIVE LOADSTONE.
ATTRACTORISCHES MAGNETEISEN.
FER OXYDULE. (*Häuy*).
from Monte Calamita, Elba.

(Attracts.)

- No. 40. MAGNETIC IRON ORE.
MAGNETEISEN; MAGNETIT.
(*Haid.*)
FER OXYDULK. (*Häuy*); AIM-
ANT. (*Beud.*).
from Arendal in Norway.

(Attracts.)

- No. 41. MAGNETIC IRON ORE.
MAGNETEISEN (*Werner*);
MAGNETIT. (*Haid.*)
FER OXYDULK. (*Häuy*); AIM-
ANT. (*Beud.*).
from Philippstadt in Sweden.

(Attracts.)

- No. 42. RHOMBOIDAL IRON-ORE.
(*Jameson*).
MAGNETEISENSTEIN. (*Werner*).
FER OLIGISTE. (*Häuy*).
from Breitenbrunn in Saxony.

(Attracts.)

- No. 43. MAGNETIC IRON.
MAGNETEISEN. (*Werner*).
FER OXYDULE.
from Greinsee in the Tyrol.

- No. 44. CHROMIC IRON. (*Dana*).
CHROMEISENSTEIN; CHROMIT.
(*Haid.*)
SIDEROCHROME. (*Beudant*).
from Gracchan, Silesia.

- No. 45. TITANIFEROUS IRON, in Basalt.
TITANEISEN in Basalt.
TITANATE DE FER in Basalt.
from Unkel on the Rhine.

No. 46. TITANIFEROUS IRON.
TITANEISENERZ.
FER TITANE.
from Egersund, Norway.

No. 47. ISERINK.
from Riesengeberge.

No. 48. FRANKLINITE.
from Sparta in New-Jersey.

No. 49. MAGNETIC PYRITES, (*Jameson.*)
MAGNETKIES.
FER SULFURE.
from Bodenmais in Bavaria.

No. 50. IRON GLANCE.
EISENGLANZ.
FER OLIGISTE.
from Rio, Elba.

B. CHEMICAL CHARACTERS OF MINERALS.

MINERALS

TO ILLUSTRATE

KOBELL'S SCALE OF FUSIBILITY.

-
- | | |
|---|--|
| <p>No. 1. PRISMATIC FELSPAR. (<i>Jameson</i>). ADULAR. (<i>Werner</i>). FELDSPATHE. (<i>Häuy</i>). <i>from St. Gothardt, Switzerland.</i></p> | <p>No. 4. PRECIOUS GARNET; IRON- GARNET. (<i>Dana</i>). EDLER GRANAT. ALAMANDINE. (<i>Beudant</i>). <i>from Greenland.</i></p> |
| <p>No. 2. GRAY ANTIMONY ORE. ANTIMONGLANZ. ANTIMOINE SULFURE <i>from the Caspari Zeche near Arensburg.</i></p> | <p>No. 5. GLASSY ACTINOLITE. GLASIGER STRAHLSTEIN. AMPHIBOLE VITREUX. <i>from Greiner in the Tyrol.</i></p> |
| <p>No. 3. HEMIPRISMATIC SCHILLER- SPAR. (<i>Jam.</i>) BLATTRIGER ANTHOPHILIT. (<i>Werner</i>). DIALLAG METALLOIDE. BRON- ZIT. (<i>Häuy</i>). <i>from Kupferberg in Bavaria.</i></p> | <p>No. 6. NEEDLE ZEOLITE. MESOTYPSPATH. NATROLITH in Klingstein. ZEOLITE EN AIGUILLES. <i>from Aussig in Bohemia.</i></p> |
-

C A T A L O G U E
OF THE
GOVERNMENT CENTRAL MUSEUM,
M A D R A S.

ARRANGED AND COMPILED

BY

EDWARD BALFOUR, ESQ., SURGEON, MADRAS ARMY,

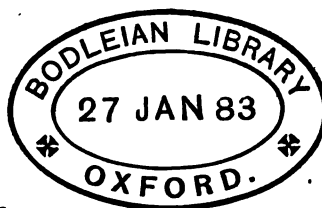
OFFICER IN CHARGE.

B. PALMONTOLOGY—Part II.

BY ORDER OF THE GOVERNMENT

OF

M A D R A S.



M A D R A S :

Printed at the Military Male Orphan Asylum Press, Mount Road.

1855.

117. 2. 1136

I am indebted to Professor MORRIS, Professor of Geology University of London, for the greatest part of these specimens.

PALÆONTOLOGY gives us an account of the remains of organic bodies, contained in, and associated with the inorganic materials of which the surface of the earth is composed, and it is of such organic remains as are in the Museum and of the rocks in which they are found that I have endeavoured, in the following pages, to construct a catalogue. In making this catalogue of the Aqueous Rocks and of the animal and vegetable remains which are found in them, the whole have been arranged Chronologically with reference to the successive geological periods when they originated. These remains are termed fossils by which is meant a body, or the traces of the existence of any body, whether animal or vegetable, which has been buried in the earth by natural causes. It is in the Aqueous Rocks that fossils chiefly occur for which reason this class of rocks are often called fossiliferous though the term sedimentary is likewise given from the circumstance of their having been deposited from water. These rocks are stratified or divided into distinct layers or strata, for *stratum* simply means a bed or any thing spread out or *strewed* over a given surface. Looking to the whole history of former life it is now almost every where acknowledged that during the formation of the sediments which compose the crust of the earth, the mineral kingdom has been at least three times entirely renovated. This has led to the whole of these strata being grouped into three great classes called the primary, secondary and tertiary, representing three periods of time, the secondary and tertiary periods being each as clearly characterised by a distinct fauna as the primeval series. Under this view the number of classes into which the fossiliferous strata may be separated are three,—but the groups may be more or less numerous according to the views of classification which different geologists entertain. The German, French and English geologists, however, who have determined the succession of strata throughout the greater part of Europe have pretty generally adopted the following arrangement of the groups of the fossiliferous strata which have been observed in Western Europe and almost all of which have their representatives in the British Isles.

TABLE I.

Showing the Nineteen Subordinate Groups of Fossiliferous Strata observed in Western Europe, arranged under three principal Sections in what is termed a descending Series or beginning with the newest.

| Tertiary, Supracretaceous*, or Cainozoic.† | | | Secondary or Mesozoic.† | | | Primary fossiliferous, or paleozoic.† | | |
|--|------------------|------------------|-------------------------|-------------------|-----------------------------------|---------------------------------------|--------------------|---|
| 1 Post Pliocene, including those of the Recent, or human period. | 6 Chalk. | 14 Permian. | 7 Greensand. | 15 Coal. | 16 Old Red Sandstone or Devonian. | 17 Upper Silurian. | 18 Lower Silurian. | 19 Cambrian and older fossiliferous strata. |
| 2 Newer Pliocene, or Pleistocene. | 8 Wealden. | 10 Upper Oolite. | 9 Upper Oolite. | 11 Middle Oolite. | 12 Lias. | 13 Trias. | | |
| 3 Older Pliocene. | 11 Lower Oolite. | | | | | | | |
| 4 Miocene. | | | | | | | | |
| 5 Eocene. | | | | | | | | |

It is not pretended that the three principal sections in the above table, No. I, called primary, secondary, and tertiary, are of equivalent importance or that the nineteen subordinate groups comprise monuments relating to equal portions of past time or of the earth's history. But it can be asserted that they each relate to successive periods during which certain animals and plants, for the most part peculiar to their respective eras, have flourished, and during which different kinds of sediment have been deposited in the space now occupied by Europe. If disposed on palæontological grounds‡ to divide the entire fossiliferous series into a few groups less numerous than those in the above table, and more nearly co-ordinate in value than the sections called primary, secondary and tertiary, SIR CHARLES LYELL considers that the six groups or periods given in the next table might be adopted.

TABLE II.

Showing the Fossiliferous Strata of Western Europe divided into six Sections.

- 1 Post Pliocene and Tertiary...from the Post Pliocene to the Eocene inclusive.
- 2 Cretaceous.....from the Maestricht chalk to the Lower Greensand inclusive.
- 3 Oolitic.....from the Wealden to the Lias inclusive.
- 4 Triassic.....including the Keuper, Muschelkalk, and Bunter Sandstein of the Germans.
- 5 Permian, Carboniferous, and Devonian.....including Magnesian Limestone (Zechstein,) Coal, Mountain Limestone and Old Red sandstone.
- 6 Silurian and Cambrian... ..from the Upper Silurian to the oldest fossiliferous rocks inclusive.

* For tertiary Sir H. De la Beche has used the term Supracretaceous, a name implying that the strata so called are superior in position to the chalk.

† Professor Phillips has adopted these terms, Cainozoic, from *Cainos*, recent, and *Zoon*, animal. Mesozoic, from *mesos*, middle &c; paleozoic, from *palaios*, ancient, &c.

‡ Palæontology is the science which treats of fossil remains both animal and vegetable. Its derivation being from *palaios*, ancient, *onta*, beings, and *logos*, a discourse.

GLOSSARY OF TERMS, ADOPTED INTO GEOLOGY FROM THE LATIN AND GREEK.

- 1 **CAINOZIC**,.....from *cainos*, recent, and *zoon*, animal.
- 2 **CAMBRIAN**,.....is a geological name suggested by Professor Sedgwick to designate part of the Silurian series of North Wales.
- 3 **DEVONIAN**,.....because that class of rocks are greatly developed in Devonshire.
- 4 **Eocene**,..... from *eos*, dawn and *cainos*, recent, implying that these fossils and rocks mark the dawn or commencement of the life in the Tertiary period.
- 5 **LIAS**,.....A provincial appellation, now generally adopted to designate the clayey limestone occurring between the upper new red sandstone and the oolite.
- 6 **MIOCENE**.....from *meion*, less, and *cainos*, recent, implying that they are less recent than the Eocene.
- 7 **OOHITE**,.....from *oolos*, egg, a limestone composed of rounded particles like the roe of a fish.
- 8 **PALEOZOIC**,.....from *palaios*, ancient, and *zoon*, life, implying those animals and vegetables that were most remotely formed.
- 9 **PERMIAN**,.....because this class of rocks are greatly developed in the Russian territory of Perm.
- 10 **POST**,.....after or subsequent to,—
- 11 **PLIOCENE**,..... from *pleion*, more, and *cainos*, recent.
- 12 **PRIMARY**,.....from *primus*, first, implying that this class comprises the primeval formed rocks.
- 13 **SECONDARY**,..... from *secundus*, second, implying second formed.
- 14 **SILURIAN**,.....because these rocks were first examined in a part of Britain wherein an ancient people, termed the Silures, had opposed a valorous resistance to the Romans.
- 15 **SUPRACRETACEOUS**.from *supra*, above, and *creta*, chalk.
- 16 **TERTIARY**,... ..from *tertius*, third, because third formed.
- 17 **TRIAS**,.....the name given on the continent to the beds of new red sandstone.
- 18 **WEALDEN**,.....from the circumstance that these rocks occur in the Weald of Sussex.

INDEX.

| I. POST TERTIARY. | | No. of the Specimen. | Page. | D. Eocene Group. | | No. of the Specimen. | Page. |
|---|---------------|----------------------|-------|---------------------------------------|---------------|----------------------|-------|
| A. Post Pliocene Group. | | | | 6. UPPER EOCENE. | | | |
| Limestone Rock, newly formed by calcareous incrustations, &c..... | Post Pliocene | 2 | 23 | Cardita acuticosta..... | Upper Eocene | 3 | 58 |
| Limestone, conglomerate of comminuted shells, gravel, &c..... | Post Pliocene | 1 | 23 | Calyptrea Trochiforme.. | Upper Eocene | 2 | 58 |
| Limestone..... | Post Pliocene | 3 | 23 | Cassidulus ?..... | Upper Eocene | 4 | 58 |
| Sandstone fine, in process of formation, large nodular concretions..... | Post Pliocene | 4 | 23 | Cyrena obovata..... | Upper Eocene | 2 | 24 |
| Sandstone Rock, in process of formation, imbedding portions of porcelain, spices, &c..... | Post Pliocene | 5 | 23 | Cytherea incrassata..... | Upper Eocene | 1 | 24 |
| | | | | Fusus bulbiformis..... | Upper Eocene | 5 | 58 |
| | | | | Helix vectensis..... | Upper Eocene | 6 | 58 |
| | | | | Hippotherium gracile.... | Upper Eocene | 7 | 58 |
| | | | | Potamides cinctus..... | Upper Eocene | 3 | 24 |
| | | | | Potamides concavus..... | Upper Eocene | 4 | 24 |
| | | | | Tertiary limestone..... | Upper Eocene | 1 | 58 |
| | | | | Venericardia planicosta.. | Upper Eocene | 5 | 24 |
| II. TERTIARY. | | | | 7. MIDDLE EOCENE. | | | |
| B. Pliocene Group. | | | | ROCKS. | | | |
| 3. NEWER PLIOCENE. | | | | | | | |
| Aporrhais Pes-pelicanus..... | Newer Plio. | 1 | 57 | Grobkalk..... | Middle Eocene | 7 | 25 |
| Astarte Borealis..... | Newer Plio. | 2 | 57 | Grobkalk with Venus.... | Middle Eocene | 8 | 25 |
| Nucula..... | Newer Plio. | 3 | 57 | Gyps jungerer..... | Middle Eocene | 6 | 24 |
| Nucula Portlandica..... | Newer Plio. | 4 | 57 | | | | |
| Sanguinolaria Fusca..... | Newer Plio. | 5 | 57 | FOSSILS. | | | |
| Unio Pictorum, Mammalian Deposits..... | Newer Plio. | 6 | 57 | Actæon simulatus..... | Middle Eocene | 8 | 58 |
| Venus Chione..... | Newer Plio. | 7 | 57 | Anomia striata..... | Middle Eocene | 9 | 59 |
| | | | | Balanus erisma..... | Middle Eocene | 10 | 59 |
| | | | | Buccinum canaliculatum (Fusus)..... | Middle Eocene | 11 | 59 |
| | | | | Bulimus ellipticus..... | Middle Eocene | 12 | 59 |
| | | | | Calyptrea Trochiforme.. | Middle Eocene | 13 | 59 |
| | | | | Cancellaria..... | Middle Eocene | 16 | 59 |
| | | | | Cancer tuberculatus..... | Middle Eocene | 15 | 59 |
| | | | | Cardium semi-granulosum | Middle Eocene | 17 | 59 |
| | | | | Cassidaria striata..... | Middle Eocene | 22 | 59 |
| | | | | Cerithium cinctum..... | Middle Eocene | 18 | 59 |
| | | | | Cerithium concavum..... | Middle Eocene | 19 | 59 |
| | | | | Cerithium margaritaceum | Middle Eocene | 20 | 59 |
| | | | | Chama squamosa..... | Middle Eocene | 14 | 59 |
| | | | | Corbula longirostrum.... | Middle Eocene | 21 | 59 |
| | | | | Crab..... | Middle Eocene | 23 | 59 |
| | | | | Crab..... | Middle Eocene | 25 | 59 |
| | | | | Crab..... | Middle Eocene | 26 | 59 |
| | | | | Crab..... | Middle Eocene | 27 | 59 |
| | | | | Crab..... | Middle Eocene | 24 | 59 |
| | | | | Cyclotus cinctus..... | Middle Eocene | 28 | 59 |
| | | | | Cyrena obovata..... | Middle Eocene | 29 | 59 |
| | | | | Cytherea incrassata..... | Middle Eocene | 30 | 59 |
| | | | | Euomphalus discus..... | Middle Eocene | 31 | 59 |
| | | | | Freshwater limestone... | Middle Eocene | 32 | 59 |
| | | | | Fusus aciculatus..... | Middle Eocene | 33 | 59 |
| | | | | Fusus labiatus..... | Middle Eocene | 34 | 59 |
| | | | | Fusus longævus (vermilia crassa)..... | Middle Eocene | 35 | 59 |
| | | | | Fusus macilentus..... | Middle Eocene | 36 | 59 |
| | | | | Fusus regularis..... | Middle Eocene | 37 | 59 |
| | | | | Fusus rostratus..... | Middle Eocene | 38 | 59 |
| | | | | Limnea globosula..... | Middle Eocene | 39 | 59 |
| C. Miocene Group. | | | | | | | |
| Cancellaria acutangula ?... | Miocene | 1 | 58 | | | | |
| Corbula rugosa..... | Miocene | 1 | 24 | | | | |
| Cyrena suburata..... | Miocene | 2 | 58 | | | | |
| Cytherea..... | Miocene | 3 | 58 | | | | |
| Fusus Burdigalensis..... | Miocene | 2 | 24 | | | | |
| Fusus Burdigalensis..... | Miocene | 4 | 58 | | | | |
| Natica variabilis..... | Miocene | 5 | 58 | | | | |
| Pecten..... | Miocene | 4 | 24 | | | | |
| Pectunculus..... | Miocene | 3 | 24 | | | | |
| Pectunculus..... | Miocene | 6 | 58 | | | | |
| Spondylus..... | Miocene | 7 | 58 | | | | |
| Strombus italicus..... | Miocene | 8 | 58 | | | | |
| Trochus magus..... | Miocene | 5 | 24 | | | | |
| Turritella terebratis..... | Miocene | 9 | 58 | | | | |

| MIDDLE EOCENE, continued. | No. of the Specimen. | Page. | LOWER EOCENE, continued. | No. of the Specimen. | Page. |
|--|----------------------|-------|-------------------------------------|----------------------|--------|
| <i>Limnea longiscata</i> | Middle Eocene | 40 59 | <i>Cerithium</i> | Lower Eocene | 88 61 |
| <i>Limnea pyramidalis</i> | Middle Eocene | 41 59 | <i>Chama squamosa</i> | Lower Eocene | 15 25 |
| <i>Melania lactea</i> | Middle Eocene | 42 59 | <i>Cordita globosa</i> | Lower Eocene | 16 25 |
| <i>Melanopsis carinatus</i> | Middle Eocene | 43 59 | <i>Cyrena cuneiformis</i> | Lower Eocene | 89 61 |
| <i>Melanopsis fusiformis</i> | Middle Eocene | 44 59 | <i>Fossil Resin</i> | Lower Eocene | 90 61 |
| <i>Natica mutabilis</i> | Middle Eocene | 45 60 | <i>Fusus</i> | Lower Eocene | 91 61 |
| <i>Nematura neritina</i> | Middle Eocene | 47 60 | <i>Fusus bulbiformis</i> | Lower Eocene | 17 25 |
| <i>Nematura pygmaea</i> | Middle Eocene | 46 60 | <i>Murex asper</i> | Lower Eocene | 95 61 |
| <i>Neritina concava</i> | Middle Eocene | 48 60 | <i>Melanopsis buccinoides</i> .. | Lower Eocene | 93 61 |
| <i>Nucula Deshayesii</i> | Middle Eocene | 49 60 | <i>Modiola elegans</i> | Lower Eocene | 94 61 |
| <i>Nummulites lavigata</i> | Middle Eocene | 50 60 | <i>Melania inquinata</i> | Lower Eocene | 92 61 |
| <i>Oliya Branderi</i> | Middle Eocene | 53 60 | <i>Nautilus centralis</i> | Lower Eocene | 96 61 |
| <i>Ostrea</i> | Middle Eocene | 51 60 | <i>Nautilus regalis</i> | Lower Eocene | 97 61 |
| <i>Ostrea callifera</i> | Middle Eocene | 9 25 | <i>Nucula amygdaloides</i> | Lower Eocene | 18 25 |
| <i>Ostrea tener</i> | Middle Eocene | 52 60 | <i>Nummulites</i> | Lower Eocene | 33 26 |
| <i>Paludina lenta</i> | Middle Eocene | 54 60 | <i>Nummulites</i> | Lower Eocene | 34 26 |
| <i>Paludina thermalis</i> | Middle Eocene | 55 60 | <i>Nummulites</i> | Lower Eocene | 35 26 |
| <i>Pholadomya margaritacea</i> .. | Middle Eocene | 56 60 | <i>Nummulites levigata</i> | Lower Eocene | 98 61 |
| <i>Pholadomya margaritacea</i> .. | Middle Eocene | 57 60 | <i>Otodus obliquus</i> (tooth of) | Lower Eocene | 99 61 |
| <i>Planorbis euomphalus</i> | Middle Eocene | 58 60 | <i>Ostrea pulchra</i> | Lower Eocene | 100 61 |
| <i>Planorbis rotundatus</i> | Middle Eocene | 10 25 | <i>Pectunculus brevirostrum</i> .. | Lower Eocene | 101 61 |
| <i>Planorbis rotundatus</i> | Middle Eocene | 59 60 | <i>Pectunculus decussatus</i> .. | Lower Eocene | 19 25 |
| <i>Planorbis rotundatus</i> | Middle Eocene | 60 60 | <i>Petrophylloides Richard-</i> | | |
| <i>Pleurotoma attenuata</i> | Middle Eocene | 61 60 | <i>soni</i> | Lower Eocene | 20 25 |
| <i>Pleurotoma filosa</i> | Middle Eocene | 62 60 | <i>Petrophylloides Richard-</i> | | |
| <i>Potamides</i> | Middle Eocene | 63 60 | <i>soni</i> | Lower Eocene | 102 61 |
| <i>Potamides muricatus</i> | Middle Eocene | 64 60 | <i>Pinna affinis</i> | Lower Eocene | 106 61 |
| <i>Potamides ventricosus</i> | Middle Eocene | 65 60 | <i>Planorbis</i> | Lower Eocene | 21 25 |
| <i>Potamomya plana</i> | Middle Eocene | 66 60 | <i>Palæophis tollapicus</i> | Lower Eocene | 22 25 |
| <i>Psammobia compressa</i> ? | Middle Eocene | 67 60 | <i>Rostellaria macroptera</i> | Lower Eocene | 103 61 |
| <i>Psammobia rugosa</i> | Middle Eocene | 68 66 | <i>Septarium</i> | Lower Eocene | 25 25 |
| <i>Psammobia rudis</i> | Middle Eocene | 69 60 | <i>Septarium</i> | Lower Eocene | 26 25 |
| <i>Rostellaria fissinella</i> | Middle Eocene | 70 60 | <i>Septarium</i> | Lower Eocene | 27 25 |
| <i>Rostellaria rimosa</i> | Middle Eocene | 71 60 | <i>Septarium</i> | Lower Eocene | 28 25 |
| <i>Sanguinolaria Hollowaysii</i> .. | Middle Eocene | 72 60 | <i>Septarium</i> | Lower Eocene | 29 25 |
| <i>Seraphs convolutus</i> | Middle Eocene | 73 60 | <i>Septarium</i> | Lower Eocene | 30 25 |
| <i>Silicious limestone</i> | Middle Eocene | 11 25 | <i>Septarium</i> | Lower Eocene | 31 26 |
| <i>Strombus Bartonensis</i> | Middle Eocene | 74 60 | <i>Septarium</i> | Lower Eocene | 32 26 |
| <i>Triton argutus</i> | Middle Eocene | 75 60 | <i>Strombus Bartonensis</i> | Lower Eocene | 23 25 |
| <i>Triton Flandricum</i> | Middle Eocene | 76 60 | <i>Thracia oblata</i> | Lower Eocene | 105 61 |
| <i>Trochus monilifer</i> | Middle Eocene | 77 60 | <i>Teredo antenauta</i> | Lower Eocene | 104 61 |
| <i>Turritella imbricatana</i> | Middle Eocene | 78 60 | <i>Trochus monilifer</i> | Lower Eocene | 24 25 |
| <i>Turritella terebella</i> | Middle Eocene | 79 60 | <i>Vermetus Bognoriensis</i> .. | Lower Eocene | 107 61 |
| <i>Unio Solandri</i> | Middle Eocene | 80 60 | <i>Vertebra</i> of? | Lower Eocene | 36 26 |
| <i>Venericardia (cardita)</i> | Middle Eocene | 85 61 | <i>Voluta nodosa</i> | Lower Eocene | 108 61 |
| <i>Venus tenuistriata</i> | Middle Eocene | 86 61 | <i>Voluta Wetherellii</i> (rare) .. | Lower Eocene | 109 61 |
| <i>Voluta ambigua</i> | Middle Eocene | 81 60 | | | |
| <i>Voluta luctator</i> | Middle Eocene | 82 61 | | | |
| <i>Voluta lima</i> | Middle Eocene | 83 61 | | | |
| <i>Voluta spinosa</i> | Middle Eocene | 84 61 | | | |
| 8. LOWER EOCENE. | | | III. SECONDARY. | | |
| <i>Ampullaria ambulacrum</i> .. | Lower Eocene | 12 25 | E. Cretaceous Group. | | |
| <i>Axinus angulatus</i> | Lower Eocene | 13 25 | 9. MÆSTRICHT BEDS. | | |
| <i>Cassidaria carinata</i> | Lower Eocene | 87 61 | <i>Ananchytes ovata</i> | Maes. Beds | 1 27 |
| <i>Casts of fossil shells, &c.</i> | Lower Eocene | 14 25 | <i>Baculitis Farjasii</i> | Maes. Beds | 2 27 |
| | | | <i>Belemnitis Listeri</i> | Maes. Beds | 3 27 |
| | | | <i>Belemnitella mucronata</i> .. | Maes. Beds | 4 27 |
| | | | — ? Mæstricht... | Maes. Beds | 5 27 |

I N D E X.

iii

| MAESTRICHT BEDS— continued. | No. of the Specimen. | Page. | UPPER WHITE CHALK— continued. | No. of the Specimen. | Page. |
|--------------------------------|-------------------------|-------|----------------------------------|-------------------------|-------|
| Ditropa..... | Maes. Beds | 1 62 | Inoceramus Brongniartii | U. whiteChalk | 17 63 |
| Nerita rugosa..... | Maes. Beds | 6 27 | Inoceramus Cuvieri..... | U. whiteChalk | 18 63 |
| Ostrea..... | Maes. Beds | 2 62 | Inoceramus..... | U. whiteChalk | 19 63 |
| Otodus appendiculatus.. | Maes. Beds | 7 27 | Inoceramus Cuvieri..... | U. whiteChalk | 40 28 |
| Pagurus Faujasii..... | Maes. Beds | 3 62 | Iron pyrites, nodules of.. | U. whiteChalk | 41 28 |
| Pecten quadricostatus.. | Maes. Beds | 8 27 | Madrepora centralis..... | U. whiteChalk | 44 28 |
| Terebratula subplicata.. | Maes. Beds | 9 27 | Marsupites Milleri..... | U. whiteChalk | 42 28 |
| | | | Marsupites Milleri..... | U. whiteChalk | 43 28 |
| | | | Millepora corymbosa..... | U. whiteChalk | 20 63 |
| | | | Millepora globularis..... | U. whiteChalk | 21 63 |
| | | | Micraster cor-anguinum.. | U. whiteChalk | 22 63 |
| | | | Micraster rostratus var.: | U. whiteChalk | 23 63 |
| | | | Ostrea semiplana..... | U. whiteChalk | 24 63 |
| | | | Pecten..... | U. whiteChalk | 47 29 |
| | | | Pecten quinque-costatus.. | U. whiteChalk | 25 63 |
| | | | Pecten membranaceus, Niln | U. whiteChalk | 26 63 |
| | | | Pecten nitidus..... | U. whiteChalk | 45 28 |
| | | | Pecten nitidus..... | U. whiteChalk | 46 29 |
| | | | Plagiostoma..... | U. whiteChalk | 48 29 |
| | | | Plagiostoma spinosa..... | U. whiteChalk | 49 29 |
| | | | Plagiostoma spinosa..... | U. whiteChalk | 50 29 |
| | | | Ptychodus latior or altior | U. whiteChalk | 27 63 |
| | | | Serpula..... | U. whiteChalk | 29 63 |
| | | | Serpula..... | U. whiteChalk | 30 63 |
| | | | Serpula macropus..... | U. whiteChalk | 28 63 |
| | | | Spatangus..... | U. whiteChalk | 56 29 |
| | | | Spatangus..... | U. whiteChalk | 57 29 |
| | | | Spatangus cor-anguinum.. | U. whiteChalk | 51 29 |
| | | | Spatangus cor-anguinum.. | U. whiteChalk | 52 29 |
| | | | Spatangus cor-anguinum.. | U. whiteChalk | 53 29 |
| | | | Spatangus cor-anguinum.. | U. whiteChalk | 54 29 |
| | | | Spatangus cor-anguinum.. | U. whiteChalk | 55 29 |
| | | | Spondylus..... | U. whiteChalk | 33 63 |
| | | | Spondylus..... | U. whiteChalk | 34 63 |
| | | | Spondylus spinosus..... | U. whiteChalk | 58 29 |
| | | | Spondylus spinosus..... | U. whiteChalk | 59 29 |
| | | | Spondylus spinosus..... | U. whiteChalk | 31 63 |
| | | | Spondylus spinosus, (Pla- | | |
| | | | giostoma)..... | U. whiteChalk | 32 63 |
| | | | Sponges..... | U. whiteChalk | 60 29 |
| | | | Teeth of fish..... | U. whiteChalk | 61 29 |
| | | | Teeth of fish..... | U. whiteChalk | 62 29 |
| | | | Teeth of fish..... | U. whiteChalk | 63 29 |
| | | | Teeth of fish..... | U. whiteChalk | 64 29 |
| | | | Teeth of (Ptychodus) fish, | | |
| | | | chalk..... | U. whiteChalk | 65 29 |
| | | | Terebratula carnea..... | U. whiteChalk | 69 29 |
| | | | Terebratula carnea ?..... | U. whiteChalk | 70 29 |
| | | | Terebratula carnea..... | U. whiteChalk | 35 63 |
| | | | Terebratula carnea..... | U. whiteChalk | 36 63 |
| | | | Terebratula Defranci..... | U. whiteChalk | 71 29 |
| | | | Terebratula Defranci..... | U. whiteChalk | 72 29 |
| | | | Terebratula ?..... | U. whiteChalk | 73 29 |
| | | | Terebratula..... | U. whiteChalk | 74 29 |
| | | | Terebratula ?..... | U. whiteChalk | 75 29 |
| | | | Terebratula ?..... | U. whiteChalk | 76 29 |

| UPPER WHITE CHALK— continued. | | No. of the Specimen. | Page. | 12. UPPER GREENSAND. | | No. of the Specimen. | Page. |
|----------------------------------|----------------|-------------------------|-------|---------------------------------------|--|-------------------------|--------|
| Terebratula— ?..... | U. white Chalk | 77 | 29 | ROCK. | | | |
| Terebratula nerviensis.... | U. white Chalk | 37 | 63 | Greensand rock..... | | U. Greensand | 98 30 |
| Terebratula plicatulus.... | U. white Chalk | 38 | 63 | FOSSILS. | | | |
| Terebratula..... | U. white Chalk | 66 | 29 | Achilleum voluta..... | | U. Greensand | 65 64 |
| Terebratula semiglobosa.... | U. white Chalk | 67 | 29 | Ammonites varicosus.... | | U. Greensand | 66 64 |
| Terebratula semiglobosa.... | U. white Chalk | 39 | 63 | Ammonites varicosus.... | | U. Greensand | 67 64 |
| Terebratula subplicata.... | U. white Chalk | 40 | 63 | Cardium Hillanum..... | | U. Greensand | 99 30 |
| Terebratula striata..... | U. white Chalk | 68 | 29 | Cardium Hillanum..... | | U. Greensand | 100 30 |
| Ventriculites..... | U. white Chalk | 78 | 29 | Cidaris..... | | U. Greensand | 101 30 |
| Vertebrate animal..... | U. white Chalk | 41 | 63 | Cyprina cuneata..... | | U. Greensand | 103 30 |
| Ventriculites chalk..... | U. white Chalk | 80 | 29 | Cytherea caperata..... | | U. Greensand | 104 30 |
| Ventriculites, in flint..... | U. white Chalk | 42 | 63 | Cyprina angulata..... | | U. Greensand | 69 64 |
| Ventriculites simplex..... | U. white Chalk | 43 | 63 | Cyprina angulata..... | | U. Greensand | 70 64 |
| Ventriculites simplex..... | U. white Chalk | 79 | 29 | Cucullæa carinata..... | | U. Greensand | 102 30 |
| Ventriculites radiatus.... | U. white Chalk | 81 | 29 | Cucullæa carinata..... | | U. Greensand | 68 64 |
| | | | | Discoidea subuculus.... | | U. Greensand | 105 30 |
| | | | | Discoidea subuculus.... | | U. Greensand | 71 64 |
| | | | | Exogyra conica..... | | U. Greensand | 106 30 |
| | | | | Exogyra conica..... | | U. Greensand | 72 64 |
| | | | | Gryphæa columba..... | | U. Greensand | 107 30 |
| | | | | Inoceramus concentricus.. | | U. Greensand | 73 64 |
| | | | | Pectunculus umbonatus.. | | U. Greensand | 75 64 |
| | | | | Pecten quadricostatus.... | | U. Greensand | 74 64 |
| | | | | Pecten quinquecostatus.... | | U. Greensand | 108 30 |
| | | | | Spatangus curvatus..... | | U. Greensand | 77 64 |
| | | | | Siphonia pyriformis..... | | U. Greensand | 109 30 |
| | | | | Siphonia pyriformis..... | | U. Greensand | 76 64 |
| | | | | Sponges..... | | U. Greensand | 78 64 |
| | | | | Sponges..... | | U. Greensand | 79 64 |
| | | | | Sponges..... | | U. Greensand | 80 65 |
| | | | | Spongia..... | | U. Greensand | 110 30 |
| | | | | Terebratula biplicata.... | | U. Greensand | 111 31 |
| | | | | Venus caperata..... | | U. Greensand | 82 65 |
| | | | | Vermicularia concava.... | | U. Greensand | 81 65 |
| | | | | Venus lineolata..... | | U. Greensand | 113 31 |
| | | | | 13. GAULT. | | | |
| | | | | Ammonites Beudantii.... | | Gault | 84 65 |
| | | | | Ammonites dentatus..... | | Gault | 115 31 |
| | | | | Ammonites dentatus..... | | Gault | 116 31 |
| | | | | Ammonites inflatus var.. | | Gault | 83 65 |
| | | | | Ammonites laevis..... | | Gault | 117 31 |
| | | | | Ammonites proboscideus... | | Gault | 118 31 |
| | | | | Ammonites serratus..... | | Gault | 85 65 |
| | | | | Ammonites splendensis & binus..... | | Gault | 114 31 |
| | | | | Ammonites varicosus..... | | Gault | 119 31 |
| | | | | Ammonites varians..... | | Gault | 120 31 |
| | | | | Avicula gryphæoides.... | | Gault | 86 65 |
| | | | | Dentalium ellipticum.... | | Gault | 87 65 |
| | | | | Fungia Konigi..... | | Gault | 121 31 |
| | | | | Hamites attenuatus..... | | Gault | 122 31 |
| | | | | Hamite..... | | Gault | 123 31 |
| | | | | Hamites maximus..... | | Gault | 124 31 |

INDEX.

v

| GAULT—continued. | | No. of the Specimen. | Page. | F. Wealden Group. | | No. of the Specimen. | Page. |
|----------------------------|---------------|----------------------|-------|-----------------------------|--------------|----------------------|-------|
| | | | | ROCKS. | | | |
| Hamites maximus..... | Gault | 88 | 65 | Weald clay..... | Wealden | 1 | 32 |
| Inoceramus maximus. . | Gault | 89 | 65 | Weald clay..... | Wealden | 2 | 32 |
| Inoceramus sulcatus..... | Gault | 90 | 65 | Weald clay..... | Wealden | 3 | 32 |
| Nucula ovata..... | Gault | 125 | 31 | FOSSILS. | | | |
| Plicatula pectinoides..... | Gault | 91 | 65 | Bufonites (fish palates)... | Wealden | 1 | 66 |
| Rostellaria | Gault | 126 | 31 | Cyclas media..... | Wealden | 2 | 66 |
| Solarium | Gault | 92 | 65 | Cypris Valdensis..... | Wealden | 3 | 66 |
| Solarium ornatum..... | Gault | 93 | 65 | Cypris Valdensis..... | Wealden | 4 | 66 |
| Spatangus..... | Gault | 127 | 31 | Cypris Valdensis..... | Wealden | 5 | 32 |
| Terebratula biplicata..... | Gault | 94 | 65 | Cypris Valdensis..... | Wealden | 5 | 66 |
| Terebratula depressa..... | Gault | 112 | 30 | Cyrena media..... | Wealden | 4 | 32 |
| Terebratula obtusa..... | Gault | 96 | 65 | Endogenites erosa..... | Wealden | 6 | 32 |
| Terebratula sulcata..... | Gault | 95 | 65 | Lonchopteris Mantelli.... | Wealden | 7 | 33 |
| Trochocyathus..... | Gault | 97 | 65 | Lonchopteris Mantelli.... | Wealden | 6 | 66 |
| Trochocyathus..... | Gault | 98 | 65 | Paludina elongata..... | Wealden | 8 | 32 |
| Venericardia tenuicosta .. | Gault | 128 | 31 | Paludina fluviurum..... | Wealden | 9 | 32 |
| | | | | Unio Gaulteri..... | Wealden | 7 | 66 |
| | | | | Unio Gaulteri.... | Wealden | 8 | 66 |
| § Lower Cretaceous Group. | | | | G. Oolite. | | | |
| 14. LOWER GREENSAND. | | | | 18. UPPER OOLITE. | | | |
| ROCKS. | | | | a. Portland building stone. | | | |
| Cyclas limestone..... | L. Cretaceous | 99 | 65 | b. Portland sand. | | | |
| Ferruginous sand..... | L. Cretaceous | 100 | 65 | ROCKS. | | | |
| Greensand..... | L. Cretaceous | 101 | 65 | Iron Oolite..... | Upper Oolite | 1 | 67 |
| Greensand with fossils.... | L. Cretaceous | 102 | 65 | Oolite..... | Upper Oolite | 1 | 32 |
| Marls..... | L. Cretaceous | 103 | 65 | Oolite..... | Upper Oolite | 2 | 33 |
| Whitby sands..... | L. Cretaceous | 104 | 65 | Oolite..... | Upper Oolite | 3 | 33 |
| FOSSILS. | | | | Oolite..... | Upper Oolite | 3 | 33 |
| Arca Raulini..... | L. Cretaceous | 105 | 65 | Oolite..... | Upper Oolite | 5 | 33 |
| Astacus vectensis..... | L. Cretaceous | 106 | 65 | Oolite..... | Upper Oolite | 6 | 33 |
| Astacus vectensis..... | L. Cretaceous | 107 | 65 | Oolite..... | Upper Oolite | 2 | 67 |
| Gervillia aviculoides..... | L. Cretaceous | 129 | 31 | Upper Jura limestone.... | Upper Oolite | 4 | 33 |
| Gervillia aviculoides..... | L. Cretaceous | 110 | 66 | FOSSILS. | | | |
| Gervillia aviculoides..... | L. Cretaceous | 111 | 66 | Ammonites biplex..... | Upper Oolite | 3 | 67 |
| Gervillia linguloides..... | L. Cretaceous | 112 | 66 | Axinus obscurus..... | Upper Oolite | 4 | 67 |
| Gryphæa sinuata..... | L. Cretaceous | 130 | 31 | Oolitic fossils (20)..... | Upper Oolite | 7 | 33 |
| Nautilus undulatus..... | L. Cretaceous | 113 | 66 | Ostrea distorta..... | Upper Oolite | 8 | 33 |
| Panopæa plicata..... | L. Cretaceous | 108 | 66 | Trigonia gibbosa..... | Upper Oolite | 9 | 33 |
| Panopæa plicata..... | L. Cretaceous | 115 | 66 | c. Kimmeridge Clay. | | | |
| Pecten interstriatus..... | L. Cretaceous | 114 | 66 | Ammonites biplex..... | Upper Oolite | 10 | 33 |
| Pema Mulleti..... | L. Cretaceous | 131 | 31 | Ostrea deltoidea..... | Upper Oolite | 11 | 33 |
| Serpula..... | L. Cretaceous | 116 | 66 | Pinna ampla..... | Upper Oolite | 12 | 33 |
| Sphæra corrugata..... | L. Cretaceous | 132 | 31 | Terebratula inconstans.... | Upper Oolite | 13 | 33 |
| Terebratula Gibbsii..... | L. Cretaceous | 133 | 31 | Terebratula intermedia.... | Upper Oolite | 14 | 33 |
| Terebratula sella..... | L. Cretaceous | 135 | 31 | Terebratula intermedia.... | Upper Oolite | 15 | 33 |
| Terebratula sella..... | L. Cretaceous | 136 | 31 | Thracia depressa..... | Upper Oolite | | |
| Terebratula sella..... | L. Cretaceous | 117 | 66 | | | | |
| Teredina, in wood..... | L. Cretaceous | 118 | 66 | | | | |
| Thetis minor..... | L. Cretaceous | 119 | 66 | | | | |
| Thetis minor..... | L. Cretaceous | 134 | 31 | | | | |
| Turritella, &c..... | L. Cretaceous | 109 | 66 | | | | |

| 19. MIDDLE OOLITE. | | No. of the Specimen. | Page. | MIDDLE OOLITE—continued. | | No. of the Specimen. | Page. |
|--|---------------|----------------------|-------|--------------------------------------|---------------|----------------------|-------|
| <i>a. Coral Rag.</i> | | | | | | | |
| <i>Ammonites callovienensis</i> .. | Middle Oolite | 19 | 67 | <i>Belemnites hastatus</i> .. | Middle Oolite | 42 | 34 |
| <i>Astrea</i> .. | Middle Oolite | 16 | 33 | <i>Belemnites lanciliculatus</i> .. | Middle Oolite | 40 | 34 |
| <i>Astrea limbata</i> .. | Middle Oolite | 5 | 67 | <i>Belemnites lanciliculatus</i> .. | Middle Oolite | 41 | 34 |
| <i>Astrea ovata</i> .. | Middle Oolite | 6 | 67 | <i>Gryphæa dilatata</i> .. | Middle Oolite | 44 | 34 |
| <i>Astarte ovata</i> .. | Middle Oolite | 17 | 83 | <i>Gryphæa dilatata</i> .. | Middle Oolite | 45 | 34 |
| <i>Astarte cypricardia</i> (modiolaris) .. | Middle Oolite | 18 | 33 | <i>Lima læviscula</i> .. | Middle Oolite | 47 | 34 |
| <i>Caryophyllia annularis</i> .. | Middle Oolite | 19 | 33 | <i>Lima rigida</i> .. | Middle Oolite | 46 | 34 |
| <i>Caryophyllia annulatus</i> .. | Middle Oolite | 20 | 33 | <i>Modiola bipartita</i> .. | Middle Oolite | 48 | 34 |
| <i>Ceripora radiformis</i> .. | Middle Oolite | 7 | 67 | <i>Ostrea, calcareous gut</i> .. | Middle Oolite | 49 | 34 |
| <i>Cidaris Blumenbachii</i> .. | Middle Oolite | 8 | 67 | <i>Ostrea gregaria</i> .. | Middle Oolite | 50 | 34 |
| <i>Cidaris Blumenbachii</i> .. | Middle Oolite | 21 | 33 | <i>Ostrea Marshii</i> .. | Middle Oolite | 51 | 34 |
| <i>Cidaris crenularis</i> .. | Middle Oolite | 9 | 67 | <i>Ostrea Marshii</i> .. | Middle Oolite | 52 | 34 |
| <i>Coral rag</i> .. | Middle Oolite | 10 | 67 | <i>Panopæa gibbosa</i> .. | Middle Oolite | 29 | 68 |
| <i>Coral rag</i> .. | Middle Oolite | 23 | 33 | <i>Plesiosaurus, vertebra of</i> .. | Middle Oolite | 53 | 34 |
| <i>Corals, corallines</i> .. | Middle Oolite | 22 | 33 | <i>Stellaria</i> .. | Middle Oolite | 30 | 68 |
| <i>Corals</i> .. | Middle Oolite | 24 | 33 | <i>Terebratula impressa</i> .. | Middle Oolite | 54 | 34 |
| <i>Hemicidaris intermedia</i> .. | Middle Oolite | 25 | 33 | 20. LOWER OOLITE. | | | |
| <i>Hemicidaris intermedia</i> .. | Middle Oolite | 26 | 33 | <i>a. Cornbrash.</i> | | | |
| <i>Lithodomus inclusus</i> .. | Middle Oolite | 11 | 67 | <i>Acrosalenia hemicidaroides</i> .. | Lower Oolite | 55 | 34 |
| <i>Nucleolites clunicularis</i> .. | Middle Oolite | 12 | 67 | <i>Nucleolites clunicularis</i> .. | Lower Oolite | 56 | 34 |
| <i>Pecten coralline</i> .. | Middle Oolite | 27 | 33 | <i>Nucleolites depressus</i> .. | Lower Oolite | 32 | 68 |
| <i>Pecten levis</i> .. | Middle Oolite | 13 | 67 | <i>Ostrea Marshii</i> .. | Lower Oolite | 33 | 68 |
| <i>Pentacmites pentagonalis</i> .. | Middle Oolite | 14 | 67 | <i>Pholadomya lirata</i> .. | Lower Oolite | 57 | 34 |
| <i>Pecopteris tenuis</i> .. | Middle Oolite | 16 | 67 | <i>Pholadomya producta</i> .. | Lower Oolite | 58 | 35 |
| <i>Pterophyllum comptum</i> .. | Middle Oolite | 17 | 67 | <i>Pholadomya producta</i> .. | Lower Oolite | 59 | 35 |
| <i>Pterophyllum comptum</i> .. | Middle Oolite | 18 | 67 | <i>Terebratula intermedia</i> .. | Lower Oolite | 34 | 68 |
| <i>Terebratula biplicata</i> .. | Middle Oolite | 15 | 67 | <i>Terebratula intermedia</i> .. | Lower Oolite | 60 | 35 |
| <i>Terebratula ornithocephala</i> .. | Middle Oolite | 20 | 67 | <i>Terebratula lagenalis</i> .. | Lower Oolite | 35 | 68 |
| <i>Terebratula pectunculus</i> .. | Middle Oolite | 28 | 33 | <i>Terebratula lagenalis</i> .. | Lower Oolite | 61 | 35 |
| <i>b. Oxford Clay.</i> | | | | <i>Terebratula obovata</i> .. | Lower Oolite | 62 | 35 |
| <i>Ammonites athleta</i> .. | Middle Oolite | 29 | 34 | <i>Terebratula obovata</i> .. | Lower Oolite | 36 | 68 |
| <i>Ammonites Brighii</i> .. | Middle Oolite | 21 | 67 | <i>a. Forest Marble.</i> | | | |
| <i>Ammonites Comptoni</i> .. | Middle Oolite | 22 | 67 | <i>Forest marble</i> .. | Lower Oolite | 63 | 35 |
| <i>Ammonites Comptoni</i> .. | Middle Oolite | 23 | 67 | <i>Fish palate</i> .. | Lower Oolite | 64 | 35 |
| <i>Ammonites cordatus</i> .. | Middle Oolite | 30 | 34 | <i>Fish palates</i> .. | Lower Oolite | 65 | 35 |
| <i>Ammonites cristatus</i> .. | Middle Oolite | 31 | 34 | <i>Hybodus</i> .. | Lower Oolite | 66 | 35 |
| <i>Ammonites cristatus?</i> .. | Middle Oolite | 32 | 34 | <i>Mya, var: scripta</i> .. | Lower Oolite | 67 | 35 |
| <i>Ammonites Duncanii</i> .. | Middle Oolite | 33 | 34 | <i>Terebratula maxillata</i> .. | Lower Oolite | 68 | 35 |
| <i>Ammonites Elizabethæ</i> .. | Middle Oolite | 24 | 67 | <i>Terebratula varians</i> .. | Lower Oolite | 69 | 35 |
| <i>Ammonites Elizabethæ</i> .. | Middle Oolite | 25 | 67 | <i>Trigonia nullus</i> .. | Lower Oolite | 70 | 35 |
| <i>Ammonites excavatus</i> .. | Middle Oolite | 26 | 68 | <i>b. Great Oolite.</i> | | | |
| <i>Ammonites Gowerianus</i> .. | Middle Oolite | 34 | 34 | <i>Astarte rhomboidalis</i> .. | Lower Oolite | 37 | 68 |
| <i>Ammonites hecticus</i> .. | Middle Oolite | 27 | 68 | <i>Gervillia actua</i> .. | Lower Oolite | 38 | 68 |
| <i>Ammonites Jason or Elizabethæ</i> .. | Middle Oolite | 35 | 34 | <i>Lima cardioides</i> .. | Lower Oolite | 71 | 35 |
| <i>Ammonites Knightii</i> .. | Middle Oolite | 36 | 34 | <i>Modiola aspera</i> .. | Lower Oolite | 72 | 35 |
| <i>Ammonites Lamberti</i> .. | Middle Oolite | 37 | 34 | <i>Modiola imbricata</i> .. | Lower Oolite | 39 | 68 |
| <i>Ammonites Lamberti</i> .. | Middle Oolite | 28 | 68 | <i>Ostrea acuminata</i> .. | Lower Oolite | 73 | 35 |
| <i>Ammonites vertebralis</i> .. | Middle Oolite | 29 | 68 | <i>Ostrea gregaria</i> .. | Lower Oolite | 75 | 35 |
| <i>Belemnites</i> .. | Middle Oolite | 43 | 34 | | | | |
| <i>Belemnites abbreviatus</i> .. | Middle Oolite | 38 | 34 | | | | |
| <i>Belemnites elongatus?</i> .. | Middle Oolite | 39 | 34 | | | | |

INDEX.

vii

| LOWER OOLITE—continued. | | No. of the Specimen. | 6 to 8. | LOWER OOLITE—continued. | | No. of the Specimen. | 6 to 8. |
|------------------------------|--------------|----------------------|---------------|-----------------------------|--------------|----------------------|---------------|
| Ostrea palmetta..... | Lower Oolite | 74 | 35 | Terebratula varians..... | Lower Oolite | 112 | 36 |
| Pecten laminatus..... | Lower Oolite | 80 | 35 | Terebratula varians..... | Lower Oolite | 48 | 68 |
| Patella rugosa..... | Lower Oolite | 76 | 35 | | | | |
| Pecten vagans..... | Lower Oolite | 78 | 35 | | | | |
| Pecten vagans..... | Lower Oolite | 79 | 35 | | | | |
| Pecten vimineus..... | Lower Oolite | 77 | 35 | | | | |
| Pholadomya..... | Lower Oolite | 81 | 35 | <i>d. Inferior Oolite.</i> | | | |
| Pholadomya..... | Lower Oolite | 82 | 35 | Amphidesma decustatum.. | Lower Oolite | 114 | 36 |
| Pteroperna costatula.... | Lower Oolite | 84 | 35 | Amphidesma secuneforme.. | Lower Oolite | 115 | 36 |
| Serpula..... | Lower Oolite | 85 | 35 | Ammonites concavus.... | Lower Oolite | 116 | 36 |
| Serpula..... | Lower Oolite | 86 | 35 | Ammonites falcifer?... .. | Lower Oolite | 117 | 36 |
| Terebratula..... | Lower Oolite | 88 | 35 | Ammonites Humphriesia- | | | |
| Terebratula concinna, Sow: | Lower Oolite | 87 | 35 | nus..... | Lower Oolite | 118 | 36 |
| Terebratula intermedia.... | Lower Oolite | 40 | 68 | Ammonites Parkinsoni.. | Lower Oolite | 119 | 36 |
| Terebratula maxillata.... | Lower Oolite | 89 | 35 | Ammonites Parkinsoni.. | Lower Oolite | 120 | 36 |
| Terebratula maxillata.... | Lower Oolite | 90 | 35 | Ammonites Parkinsoni.. | Lower Oolite | 49 | 68 |
| Terebratula maxillata.... | Lower Oolite | 41 | 68 | Ammonites spinatus.... | Lower Oolite | 123 | 36 |
| Terebratula orbicularis.... | Lower Oolite | 42 | 68 | Ammonites Yeovil..... | Lower Oolite | 113 | 36 |
| Trochus punctatus..... | Lower Oolite | 91 | 35 | Astarte elegans... .. | Lower Oolite | 50 | 68 |
| | | | | Astarte elegans... .. | Lower Oolite | 51 | 68 |
| | | | | Astarte elegans... .. | Lower Oolite | 121 | 36 |
| | | | | Astarte modiolaris... .. | Lower Oolite | 122 | 36 |
| | | | | Astarte modiolaris... .. | Lower Oolite | 52 | 68 |
| <i>b. Bradford Clay.</i> | | | | Belemnite shewing alveo- | | | |
| Apiocrinus Parkinsoni.... | Lower Oolite | 92 | 35 | lus..... | Lower Oolite | 53 | 69 |
| Apiocrinus Parkinsoni.. | Lower Oolite | 93 | 36 | Circus..... | Lower Oolite | 125 | 36 |
| Apiocrinus Parkinsoni.. | Lower Oolite | 94 | 36 | Circus..... | Lower Oolite | 126 | 36 |
| Apiocrinus rotundus.... | Lower Oolite | 43 | 68 | Clyphus..... | Lower Oolite | 129 | 37 |
| Ostrea costatus... .. | Lower Oolite | 44 | 68 | Clyphus..... | Lower Oolite | 130 | 37 |
| Terebratula coarctata, Par- | | | | Clyphus sinuatus..... | Lower Oolite | 131 | 37 |
| kinsoni..... | Lower Oolite | 95 | 36 | Clyphus sinuatus..... | Lower Oolite | 127 | 37 |
| Terebratula coarctata... .. | Lower Oolite | 45 | 68 | Clyphus sinuatus..... | Lower Oolite | 128 | 37 |
| Terebratula obsoleta..... | Lower Oolite | 98 | 36 | Discoidea depressa.... | Lower Oolite | 132 | 37 |
| Terebratula concinna.... | Lower Oolite | 96 | 36 | Discoidea hemispherica.. | Lower Oolite | 54 | 69 |
| Terebratula digona.... | Lower Oolite | 97 | 36 | Isocardia concentrica... .. | Lower Oolite | 133 | 37 |
| | | | | Lima Bajocensis..... | Lower Oolite | 134 | 37 |
| <i>b. Stonesfield Slate.</i> | | | | Lutraria Jurrassi..... | Lower Oolite | 135 | 37 |
| Ammonites, Stonesfield | | | | Modiola..... | Lower Oolite | 137 | 37 |
| slate..... | Lower Oolite | 99 | 36 | Modiola plicata..... | Lower Oolite | 136 | 37 |
| Ammonites, Stonesfield | | | | Melania striata... .. | Lower Oolite | 138 | 37 |
| slate..... | Lower Oolite | 100 | 36 | Ostrea..... | Lower Oolite | 140 | 37 |
| Seeds, in Stonesfield slate. | Lower Oolite | 101 | 36 | Ostrea..... | Lower Oolite | 141 | 37 |
| Stonesfield slate.... | Lower Oolite | 102 | 36 | Ostrea Marshii, Sow :... | Lower Oolite | 139 | 37 |
| Stonesfield slate.... | Lower Oolite | 103 | 36 | Panopæa peregrina..... | Lower Oolite | 149 | 37 |
| Thuytes divaricatus... .. | Lower Oolite | 105 | 36 | Pecten, inferior oolite.... | Lower Oolite | 124 | 36 |
| Thuytes expansus... .. | Lower Oolite | 106 | 36 | Pholadomya fiducial.... | Lower Oolite | 148 | 37 |
| Terebratula impressa... .. | Lower Oolite | 104 | 36 | Plagiostoma cardiformis.. | Lower Oolite | 143 | 37 |
| Trigonia impressa..... | Lower Oolite | 107 | 36 | Plagiostoma duplicata.... | Lower Oolite | 142 | 37 |
| | | | | Pleurotomaria ornata... .. | Lower Oolite | 55 | 69 |
| <i>c. Fullers Earth.</i> | | | | Pleurotomaria ornata... .. | Lower Oolite | 144 | 37 |
| Terebratula ornithocephala | Lower Oolite | 46 | 68 | Pleurotomaria ornata... .. | Lower Oolite | 145 | 37 |
| Terebratula ornithocephala | Lower Oolite | 47 | 68 | Pleurotomaria pyramidalis | Lower Oolite | 146 | 37 |
| Terebratula ornithocephala | Lower Oolite | 108 | 36 | Pleurotomaria variabilis.. | Lower Oolite | 147 | 37 |
| Terebratula ornithocephala | Lower Oolite | 109 | 36 | Sponges..... | Lower Oolite | 150 | 37 |
| Terebratula socialis..... | Lower Oolite | 110 | 36 | Terebratula?... .. | Lower Oolite | 56 | 69 |
| Terebratula socialis..... | Lower Oolite | 111 | 36 | Terebratula angulata.... | Lower Oolite | 57 | 69 |
| | | | | Terebratula cornuta... .. | Lower Oolite | 59 | 69 |

| LIAS—continued. | | No. of the Specimen. | Page. | E. Permian Group. | | No. of the Specimen. | Page. |
|----------------------------------|------|----------------------|-------|--------------------------------------|---------------|----------------------|-------|
| | | | | UPPER PERMIAN. | | | |
| | | | | ROCKS. | | | |
| Peeten equivalvis. | Lias | 27 | 70 | Aelterer Stütz gyps | U. Permian | 1 | 41 |
| Pentacrinus | Lias | 27 | 39 | Aelterer Stütz gyps | U. Permian | 2 | 41 |
| Posidonienschiefer | Lias | 25 | 39 | Bituminous marl slate | U. Permian | 1 | 71 |
| Spirifer rostratus | Lias | 28 | 70 | Cavernous magnesian lime- | U. Permian | 2 | 71 |
| Terebratula | Lias | 29 | 39 | stone | | | |
| Terebratula furcillata | Lias | 29 | 70 | Dolomitischer gyphiten- | U. Permian | 3 | 41 |
| Terebratula numismalis | Lias | 30 | 70 | kalk | | | |
| Terebratula tetrahedra | Lias | 31 | 70 | Earthy swinestone | U. Permian | 3 | 71 |
| Tetragonolepis | Lias | 30 | 39 | Kupferschiefer | U. Permian | 5 | 41 |
| Trochus | Lias | 28 | 39 | Limestone | U. Permian | 7 | 41 |
| Unio hybrida | Lias | 31 | 39 | Magnesian limestone | U. Permian | 8 | 41 |
| | | | | Magnesian limestone | U. Permian | 9 | 41 |
| | | | | Magnesian limestone | U. Permian | 10 | 41 |
| | | | | Magnesian limestone | U. Permian | 11 | 41 |
| | | | | Magnesian limestone | U. Permian | 12 | 41 |
| | | | | Magnesian limestone | U. Permian | 14 | 41 |
| | | | | Permian limestone | U. Permian | 15 | 41 |
| | | | | Rauchwache | U. Permian | 4 | 41 |
| | | | | Weisstadt liegendes | U. Permian | 6 | 41 |
| | | | | Zechstein | U. Permian | 13 | 41 |
| | | | | Zechstein formation lime- | U. Permian | 4 | 71 |
| | | | | stone | | | |
| | | | | FOSSILS. | | | |
| | | | | Caulerpites selaginoides | U. Permian | 16 | 41 |
| | | | | Fienestella retiformis | U. Permian | 17 | 41 |
| | | | | Fienestella virgulifera | U. Permian | 5 | 71 |
| | | | | Gorgonia infundibuliformis | U. Permian | 18 | 41 |
| | | | | Productus aculeatus | U. Permian | 6 | 71 |
| | | | | Productus calvus | U. Permian | 19 | 41 |
| | | | | LOWER PERMIAN. | | | |
| | | | | | | | |
| | | | | Palmoniscus Frieslebeni | L. Permian | 8 | 71 |
| | | | | Pecten pusillus | L. Permian | 7 | 71 |
| | | | | L. Carboniferous Group. | | | |
| | | | | ROCKS. | | | |
| | | | | Anthracite | Carboniferous | 1 | 72 |
| | | | | Anthracite | Carboniferous | 26 | 43 |
| | | | | Black band iron stone | Carboniferous | 13 | 42 |
| | | | | Black shale | Carboniferous | 16 | 42 |
| | | | | Brown coal sandstone | Carboniferous | 3 | 72 |
| | | | | Cellular tufaceous lime- | Carboniferous | 18 | 42 |
| | | | | stone | | | |
| | | | | Clay | Carboniferous | 4 | 42 |
| | | | | Clay ironstone | Carboniferous | 10 | 42 |
| | | | | Clay ironstone | Carboniferous | 11 | 42 |
| | | | | Clay ironstone | Carboniferous | 12 | 42 |
| | | | | Clay shale | Carboniferous | 3 | 42 |
| | | | | Coal sandstone | Carboniferous | 2 | 72 |
| | | | | Coal | Carboniferous | 27 | 43 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| CARBONIFEROUS—continued. | No. of the Specimen. | Page. | CARBONIFEROUS—continued. | No. of the Specimen. | Page. |
|---------------------------------------|----------------------|-------|---------------------------------|----------------------|-------|
| Coal common..... | Carboniferous | 28 43 | Orbicula..... | Carboniferous | 11 72 |
| Coal..... | Carboniferous | 29 43 | Palæoniscum Wratislavi- | | |
| Coal..... | Carboniferous | 30 43 | ensis..... | Carboniferous | 64 44 |
| Coal..... | Carboniferous | 31 43 | Pecopteris..... | Carboniferous | 12 72 |
| Coal..... | Carboniferous | 33 43 | Pecopteris..... | Carboniferous | 13 72 |
| Coal..... | Carboniferous | 34 43 | Pecopteris aspidioides... | Carboniferous | 14 72 |
| Coal..... | Carboniferous | 35 43 | Pecopteris cistii..... | Carboniferous | 15 72 |
| Coal..... | Carboniferous | 36 43 | Pecopteris cyathea..... | Carboniferous | 16 72 |
| Coal parrot..... | Carboniferous | 32 43 | Pecopteris cyathea?..... | Carboniferous | 17 72 |
| Cannel coal..... | Carboniferous | 37 43 | Pecopteris Miltoni &c. ... | Carboniferous | 18 72 |
| Cannel coal..... | Carboniferous | 38 43 | Pecopteris muricata..... | Carboniferous | 19 72 |
| Cannel and common coal.. | Carboniferous | 39 43 | Pecopteris plumosa..... | Carboniferous | 20 72 |
| Fire clay..... | Carboniferous | 5 42 | Pecopteris polymorpha... | Carboniferous | 21 72 |
| Fire clay..... | Carboniferous | 6 42 | Pecopteris polymorpha... | Carboniferous | 22 72 |
| Fire clay..... | Carboniferous | 7 42 | Pecopteris Serlii..... | Carboniferous | 23 72 |
| Fire clay..... | Carboniferous | 8 42 | Pentremites florealis..... | Carboniferous | 24 72 |
| Fire clay..... | Carboniferous | 9 42 | Rhomboidal scales..... | Carboniferous | 58 43 |
| Flinty slate..... | Carboniferous | 19 42 | Sandstone..... | Carboniferous | 56 43 |
| Iron clay..... | Carboniferous | 14 42 | Shale..... | Carboniferous | 55 43 |
| Iron stone..... | Carboniferous | 15 42 | Shale..... | Carboniferous | 57 43 |
| Kohlensandstein..... | Carboniferous | 23 42 | Sigillaria..... | Carboniferous | 25 72 |
| Molasse..... | Carboniferous | 22 42 | Sigillaria..... | Carboniferous | 26 72 |
| Shale bituminous..... | Carboniferous | 1 42 | Sphenopteris affinis..... | Carboniferous | 59 44 |
| Shale bituminous..... | Carboniferous | 2 42 | Sphenopteris..... | Carboniferous | 60 44 |
| Shale bituminous..... | Carboniferous | 4 72 | Sphenopteris..... | Carboniferous | 61 44 |
| Sandstone, shale interstratified..... | Carboniferous | 25 43 | Sphenopteris elegans..... | Carboniferous | 62 44 |
| Shale..... | Carboniferous | 17 42 | Sphenopteris elegans..... | Carboniferous | 27 72 |
| Sandstone..... | Carboniferous | 20 42 | Sphenopteris latifolia..... | Carboniferous | 63 44 |
| Sandstone..... | Carboniferous | 21 42 | Sphenopteris trifoliata.... | Carboniferous | 28 72 |
| Sandstone..... | Carboniferous | 24 42 | Trigonocarpum Noggerathii..... | Carboniferous | 29 72 |
| | | | Unio carbonarius..... | Carboniferous | 66 44 |
| | | | Vegetable impressions.... | Carboniferous | 67 44 |
| FOSSILS. | | | MOUNTAIN LIMESTONE. | | |
| Casts of trees..... | Carboniferous | 65 44 | ROCKS. | | |
| Calamite..... | Carboniferous | 41 43 | Mountain limestone..... | Carboniferous | 30 73 |
| Calamite..... | Carboniferous | 42 43 | Mountain limestone..... | Carboniferous | 31 73 |
| Calamite..... | Carboniferous | 43 43 | Mountain limestone..... | Carboniferous | 91 45 |
| Calamite..... | Carboniferous | 44 43 | Mountain limestone..... | Carboniferous | 92 45 |
| Calamite..... | Carboniferous | 45 43 | Mountain limestone..... | Carboniferous | 93 45 |
| Circular scale..... | Carboniferous | 53 43 | FOSSILS. | | |
| Coprolite of a Saurian.... | Carboniferous | 46 43 | Bellerophon cornuarietis.. | Carboniferous | 68 44 |
| Cyclopteris flabelliformis.. | Carboniferous | 5 72 | Bellerophon tenuifascia... | Carboniferous | 69 44 |
| Favularia tissillata..... | Carboniferous | 50 43 | Calanispora megastoma... | Carboniferous | 70 44 |
| Fern leaves..... | Carboniferous | 48 43 | Chaetetes radians..... | Carboniferous | 71 44 |
| Figularia..... | Carboniferous | 49 43 | Cirrus retundatus..... | Carboniferous | 72 44 |
| Fishbone..... | Carboniferous | 51 43 | Clymenia undulata..... | Carboniferous | 73 44 |
| Fish scales..... | Carboniferous | 52 43 | Crinoidal stems..... | Carboniferous | 74 44 |
| Fossils..... | Carboniferous | 40 43 | Cochliodus..... | Carboniferous | 33 73 |
| Equiseta..... | Carboniferous | 47 43 | Cyathophyllia?..... | Carboniferous | 75 44 |
| Gyracanthus formosus.... | Carboniferous | 54 43 | Cyathophyllum basaltiforme..... | Carboniferous | 78 44 |
| Megalichthys Hibberti.... | Carboniferous | 6 72 | | | |
| Megalichthys Hibberti.... | Carboniferous | 7 72 | | | |
| Megalichthys Hibberti.... | Carboniferous | 8 72 | | | |
| Megalichthys Hibberti.... | Carboniferous | 9 72 | | | |
| Neuropteris Loshii..... | Carboniferous | 10 72 | | | |

INDEX.

xi

| CARBONIFEROUS—continued. | No. of the Specimen. | Page. | CARBONIFEROUS—continued. | No. of the Specimen. | Page. |
|--|----------------------|--------|--|----------------------|--------|
| Cyathophyllum fungites.. | Carboniferous | 77 44 | Spirifer glabra..... | Carboniferous | 117 45 |
| Cyathophyllum turbina- tum..... | Carboniferous | 79 44 | Spirifer glabra..... | Carboniferous | 118 45 |
| Cyathophyllum turbina- tum..... | Carboniferous | 76 44 | Spirifer papilionacea.... | Carboniferous | 123 46 |
| Cyathocrinitis rugosa.... | Carboniferous | 32 73 | Spirifer resupinata.... | Carboniferous | 120 45 |
| Enerinite..... | Carboniferous | 80 44 | Spirifer rhomboida..... | Carboniferous | 121 45 |
| Enerinite..... | Carboniferous | 81 44 | Spirifer striatus..... | Carboniferous | 124 46 |
| Enerinite..... | Carboniferous | 82 44 | Spirifer striatus..... | Carboniferous | 41 73 |
| Enerinite..... | Carboniferous | 83 44 | Syringopora ramulosa.... | Carboniferous | 126 46 |
| Enerinitic limestone.... | Carboniferous | 34 73 | Terebratula..... | Carboniferous | 132 46 |
| Euomphalus Dionysii.... | Carboniferous | 84 44 | Terebratula acuminata.... | Carboniferous | 131 46 |
| Euomphalus pentangula- tus..... | Carboniferous | 85 45 | Terebratula hastata.... | Carboniferous | 133 46 |
| Euomphalus pentangula- tus..... | Carboniferous | 35 73 | Terebratula prisca..... | Carboniferous | 130 46 |
| Fish scales..... | Carboniferous | 86 45 | Terebratula pugnus..... | Carboniferous | 127 46 |
| Goniatis sphericus.... | Carboniferous | 87 45 | Terebratula pugnus..... | Carboniferous | 128 46 |
| Lithodendron sociale.... | Carboniferous | 88 45 | Terebratula pugnus..... | Carboniferous | 129 46 |
| Michelinia tenuisepta.... | Carboniferous | 89 45 | Tulobite..... | Carboniferous | 134 46 |
| Muscle..... | Carboniferous | 90 45 | | | |
| Nacula..... | Carboniferous | 37 73 | M. Devonian Group. | | |
| Natica plicestrata..... | Carboniferous | 95 45 | Astraea..... | Upper Dev. | 1 73 |
| Naticopsis Phillipsii.... | Carboniferous | 36 73 | Astraea helianthoides.... | Upper Dev. | 2 73 |
| Nautilus, mountain lime- stone..... | Carboniferous | 94 45 | Bellerophon..... | Upper Dev. | 3 73 |
| Orthis..... | Carboniferous | 97 45 | Cyathophyllum cuspito- sum..... | Upper Dev. | 4 73 |
| Orthis resupinata..... | Carboniferous | 96 45 | Goniatis intumescens.... | Upper Dev. | 5 73 |
| Orthis resupinata..... | Carboniferous | 98 45 | Phacops laciniatus.... | Upper Dev. | 6 73 |
| Orthis resupinata..... | Carboniferous | 38 73 | Pterichthys quadratus.... | Upper Dev. | 7 73 |
| Orthis Michelinia..... | Carboniferous | 99 45 | Spirifer..... | Upper Dev. | 8 73 |
| Pecten granosus..... | Carboniferous | 39 73 | Spirifer pellico..... | Upper Dev. | 9 73 |
| Pentremites Derbiensis.. | Carboniferous | 100 45 | Spirifer Verneulii..... | Upper Dev. | 10 73 |
| Productus concinnus.... | Carboniferous | 106 45 | Turritella coronata..... | Upper Dev. | 11 73 |
| Productus gigas..... | Carboniferous | 103 45 | Triginotreta osteolata.. | Upper Dev. | 12 73 |
| Productus longispina.... | Carboniferous | 104 45 | | | |
| Productus Martini..... | Carboniferous | 105 45 | LOWER DEVONIAN. | | |
| Productus Martini..... | Carboniferous | 40 73 | ROCKS. | | |
| Productus Martini..... | Carboniferous | 109 45 | Alaunschieler, schiste alu- nifere..... | Lower Dev. | 7 46 |
| Productus Martini..... | Carboniferous | 110 45 | Devonian limestone.... | Lower Dev. | 4 46 |
| Productus Martini..... | Carboniferous | 111 45 | Devonian limestone.... | Lower Dev. | 5 46 |
| Productus, in mountain limestone..... | Carboniferous | 108 45 | Devonian limestone.... | Lower Dev. | 6 46 |
| Productus, in mountain limestone..... | Carboniferous | 101 45 | Old red sandstone..... | Lower Dev. | 2 46 |
| Productus, in mountain limestone..... | Carboniferous | 102 45 | Old red sandstone..... | Lower Dev. | 3 46 |
| Productus scabriculus.... | Carboniferous | 107 45 | Sandstone, old red.... | Lower Dev. | 1 46 |
| Spirifer..... | Carboniferous | 119 45 | | | |
| Spirifer..... | Carboniferous | 113 45 | FOSSILS. | | |
| Spirifer..... | Carboniferous | 114 45 | Brontes politer..... | Lower Dev. | 8 46 |
| Spirifer..... | Carboniferous | 115 45 | Calceola sandalina..... | Lower Dev. | 13 74 |
| Spirifer..... | Carboniferous | 116 45 | Calceola sandalina..... | Lower Dev. | 9 46 |
| Spirifer..... | Carboniferous | 125 46 | Cocconeus..... | Lower Dev. | 15 74 |
| Spirifer attenuata..... | Carboniferous | 112 45 | Cocconeus latus?..... | Lower Dev. | 10 46 |
| Spirifer distans..... | Carboniferous | 122 45 | Clymenia levigata.... | Lower Dev. | 14 74 |
| | | | Favosites spongitra.... | Lower Dev. | 11 46 |
| | | | Fenestella antiqua.... | Lower Dev. | 16 74 |
| | | | Homalotectus delphinoc- phalus..... | Lower Dev. | 17 74 |
| | | | Macrocheilus arcuatus.... | Lower Dev. | 18 74 |
| | | | Megalodon cucullatus.... | Lower Dev. | 19 74 |

| LOWER DEVONIAN— continued. | | No. of the Specimen. | Page. | UPPER SILURIAN— continued. | | No. of the Specimen. | Page. |
|---|----------------|-------------------------|-------|-------------------------------------|----------------|-------------------------|-------|
| <i>Orthis desquamata</i> | Lower Dev. | 12 | 46 | <i>Atrypa galeata</i> | Upper Silurian | 2 | 74 |
| <i>Orthoceras</i> | Lower Dev. | 13 | 46 | <i>Atrypa terebratula</i> | Upper Silurian | 3 | 74 |
| <i>Orthis</i> | Lower Dev. | 20 | 74 | <i>Aulopora serpens</i> | Upper Silurian | 23 | 48 |
| <i>Osteolepis</i> | Lower Dev. | 21 | 74 | <i>Calymene Blumenbachii</i> .. | Upper Silurian | 6 | 75 |
| <i>Osteolepis</i> | Lower Dev. | 22 | 74 | <i>Calymene Blumenbachii</i> .. | Upper Silurian | 25 | 48 |
| <i>Osteolepis major</i> | Lower Dev. | 23 | 74 | <i>Calymene Blumenbachii</i> .. | Upper Silurian | 26 | 48 |
| <i>Phacops macrophthalmus</i> .. | Lower Dev. | 24 | 74 | <i>Catenipora eschiaroides</i> .. | Upper Silurian | 27 | 48 |
| <i>Spirifer Archiaci</i> | Lower Dev. | 15 | 46 | <i>Calamopora spongitis</i> | Upper Silurian | 4 | 74 |
| <i>Spirifer canaliculatus</i> | Lower Dev. | 25 | 74 | <i>Cellepora, Madrepora, Re-</i> | | | |
| <i>Spirifer ostiolatus</i> | Lower Dev. | 16 | 46 | <i>tipora</i> | Upper Silurian | 5 | 74 |
| <i>Spirifer Verneulli</i> | Lower Dev. | 14 | 46 | <i>Coral</i> | Upper Silurian | 8 | 75 |
| <i>Spirifer Verneulli</i> | Lower Dev. | 26 | 74 | <i>Coral</i> from Dudley..... | Upper Silurian | 7 | 75 |
| ?..... | Lower Dev. | 27 | 74 | <i>Cyathophyllum dianthus</i> .. | Upper Silurian | 29 | 48 |
| <i>Strigocephalus Burtini</i> ... | Lower Dev. | 28 | 74 | <i>Cyclolites peracutus</i> | Upper Silurian | 30 | 48 |
| <i>Strigocephalus Burtini</i> ... | Lower Dev. | 17 | 46 | <i>Cyathocrinus rugosus</i> | Upper Silurian | 28 | 48 |
| <i>Terebratula asper</i> | Lower Dev. | 18 | 46 | <i>Cystiphyllum Siluriense</i> .. | Upper Silurian | 9 | 75 |
| <i>Terebratula asper</i> | Lower Dev. | 29 | 74 | <i>Euomphalus</i> | Upper Silurian | 31 | 48 |
| <i>Terebratula concentrica</i> ... | Lower Dev. | 30 | 74 | <i>Euomphalus funatus</i> | Upper Silurian | 10 | 75 |
| <i>Terebratula, Devonian</i> ... | Lower Dev. | 20 | 46 | <i>Euomphalus funatus</i> | Upper Silurian | 11 | 75 |
| <i>Terebratula ferita</i> and <i>Spi-</i> | | | | <i>Euomphalus rugosus</i> | Upper Silurian | 32 | 48 |
| <i>rifer heteroclytus</i> | Lower Dev. | 31 | 74 | <i>Favosites Gotthardicus</i> ... | Upper Silurian | 33 | 48 |
| <i>Terebratula pugnus</i> | Lower Dev. | 19 | 46 | <i>Favosites ramosa</i> | Upper Silurian | 34 | 48 |
| <i>Terebratula reticularis</i> , var. | Lower Dev. | 32 | 74 | <i>Graptolites levigatus</i> | Upper Silurian | 12 | 75 |
| W. Silurian Group. | | | | <i>Gryphaea globosa (ostrea)</i> .. | Upper Silurian | 13 | 75 |
| ROCKS. | | | | <i>Leptaena englypha</i> | Upper Silurian | 36 | 48 |
| <i>Greywacke</i> | Silurian | 2 | 47 | <i>Leptaena englypha</i> | Upper Silurian | 37 | 48 |
| <i>Greywacke</i> | Silurian | 3 | 47 | <i>Leptaena englypha</i> | Upper Silurian | 38 | 48 |
| <i>Greywacke</i> | Silurian | 4 | 47 | <i>Leptaena funiculosa</i> | Upper Silurian | 40 | 48 |
| <i>Greywacke</i> | Silurian | 7 | 47 | <i>Leptaena rugosa</i> | Upper Silurian | 39 | 48 |
| <i>Greywacke</i> | Silurian | 8 | 47 | <i>Leptaena transversalis</i> ... | Upper Silurian | 41 | 48 |
| <i>Greywacke</i> | Silurian | 10 | 47 | <i>Limaria clathrata, Lone-</i> | | | |
| <i>Greywacke</i> | Silurian | 11 | 47 | <i>dale</i> | Upper Silurian | 35 | 48 |
| <i>Greywacke</i> | Silurian | 12 | 47 | <i>Madrepore</i> | Upper Silurian | 5 | 74 |
| <i>Greywacke</i> | Silurian | 13 | 47 | <i>Olenus gibbosus</i> | Upper Silurian | 42 | 48 |
| <i>Greywacke</i> | Silurian | 16 | 47 | <i>Orthis biloba</i> | Upper Silurian | 44 | 48 |
| <i>Greywacke conglomerate</i> .. | Silurian | 1 | 47 | <i>Orthis elegantula</i> | Upper Silurian | 45 | 48 |
| <i>Greywacke sandstone</i> | Silurian | 14 | 47 | <i>Orthis hybrida</i> | Upper Silurian | 14 | 75 |
| <i>Greywacke slate</i> | Silurian | 15 | 47 | <i>Orthis hybrida</i> | Upper Silurian | 43 | 48 |
| <i>Greywacke slate</i> | Silurian | 9 | 47 | <i>Orthis rigida, Sow</i> | Upper Silurian | 46 | 48 |
| <i>Greywacke slate</i> | Silurian | 5 | 47 | <i>Pentamerus galeatus</i> | Upper Silurian | 47 | 48 |
| <i>Greywacke of Werner</i> | Silurian | 6 | 47 | <i>Pentamerus Knightii</i> ... | Upper Silurian | 17 | 75 |
| <i>Silurian limestone</i> | Silurian | 21 | 47 | <i>Pentamerus Knightii</i> ... | Upper Silurian | 15 | 75 |
| <i>Silurian limestone</i> | Silurian | 22 | 47 | <i>Pentamerus Knightii</i> ... | Upper Silurian | 48 | 48 |
| <i>Silurian sandstone</i> | Silurian | 1 | 74 | <i>Pentamerus Knightii</i> ... | Upper Silurian | 49 | 48 |
| <i>Transition limestone</i> | Silurian | 17 | 47 | <i>Pentamerus laevis</i> | Upper Silurian | 64 | 49 |
| <i>Transition limestone</i> | Silurian | 18 | 47 | <i>Phacops candidus</i> | Upper Silurian | 16 | 75 |
| <i>Transition limestone</i> | Silurian | 19 | 47 | <i>Porites (a coral)</i> | Upper Silurian | 53 | 48 |
| <i>Transition limestone</i> | Silurian | 20 | 47 | <i>Porites pyriformis</i> | Upper Silurian | 50 | 48 |
| | | | | <i>Porites pyriformis</i> | Upper Silurian | 51 | 48 |
| | | | | <i>Porites inordinata</i> | Upper Silurian | 52 | 48 |
| | | | | <i>Retipora</i> | Upper Silurian | 5 | 74 |
| | | | | <i>Spirifer biloba</i> | Upper Silurian | 19 | 75 |
| | | | | <i>Spirifer radiatus</i> | Upper Silurian | 54 | 48 |
| | | | | <i>Stromatopora concentrica</i> .. | Upper Silurian | 55 | 49 |
| | | | | <i>Stromatopora concentrica</i> .. | Upper Silurian | 18 | 75 |
| | | | | <i>Terebratula affinis</i> | Upper Silurian | 56 | 49 |
| UPPER SILURIAN. | | | | | | | |
| FOSSILS. | | | | | | | |
| <i>Agnostus pisiformis</i> | Upper Silurian | 24 | 48 | | | | |

I N D E X.

xiii

| UPPER SILURIAN— <i>continued.</i> | | No. of the Specimen. | Page. | LOWER SILURIAN— <i>continued.</i> | | No. of the Specimen. | Page. |
|--------------------------------------|-----------------|-------------------------|-------|--------------------------------------|----------------|-------------------------|-------|
| Terebratula imbricata. . . . | Upper Silurian | 57 | 49 | Graptolites foliaceus. | Lower Silurian | 61 | 49 |
| Terebratula reticularis. . . . | Upper Silurian | 21 | 75 | Ogygia Buchii. | Lower Silurian | 27 | 75 |
| Terebratula sublepidia. . . . | Upper Silurian | 20 | 75 | Orthis. | Lower Silurian | 63 | 49 |
| Trilobite, head of. | Upper Silurian | 58 | 49 | Orthis biforatus. | Lower Silurian | 28 | 75 |
| | | | | Orthis calligramma. | Lower Silurian | 62 | 49 |
| LOWER SILURIAN. | | | | Pentamerus laevis. | Lower Silurian | 64 | 49 |
| Agnostus pisiformis. | Lower Silurian | 22 | 75 | Sphaerorites aurantium. . . . | Lower Silurian | 65 | 49 |
| Asaphus Budin. | Lower Silurian | 59 | 49 | O. Cambrian Group. | | | |
| Asaphus expansus. | Lower Silurian | 23 | 75 | Thonschiefertkalk. | Cambrian | 66 | 49 |
| Asaphus raniceps. | Lower Silurian | 24 | 75 | Thonschiefer, newer. | Cambrian | 67 | 49 |
| Atrypa galeata. | Lower Silurian | 25 | 75 | Thonschiefer, older. | Cambrian | 68 | 49 |
| Graptolites. | Lower Silurian | 26 | 75 | | | | |
| Graptolites. | Lower Silurian. | 60 | 49 | | | | |

PART II.

DESCRIPTIVE GEOLOGY.

AQUEOUS ROCKS.

POST TERTIARY.

A. POST PLIOCENE GROUP.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|----------------------------|--|---|
| 1. Recent..... | <div style="display: inline-block; vertical-align: middle;"> <div style="font-size: 3em; vertical-align: middle; margin-right: 5px;">{</div> Post mooses and shell-marl, with bones of land animals, human remains and works of art..... Newer parts of modern deltas and coral reefs..... </div> | All the imbedded shells, freshwater, and marine, of living species, with occasional human remains and works of art. |
| 2. Post Pliocene.... | <div style="display: inline-block; vertical-align: middle;"> <div style="font-size: 3em; vertical-align: middle; margin-right: 5px;">{</div> Clay, marl, and volcanic tuff of Ischia, p. 113..... Loess of the Rhine, p. 117..... Newer part of boulder formation, with erratics, p. 148..... </div> | All the shells of living species. No human remains or works of art. Bones of quadrupeds, partly of extinct species. |

NONE.

I. TERTIARY.

B. PLIOCENE GROUP.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|-----------------------------------|---|---|
| 3. Newer Pliocene or Pleistocene. | <div style="display: inline-block; vertical-align: middle;"> <div style="font-size: 3em; vertical-align: middle; margin-right: 5px;">{</div> Boulder formation or drift of northern Europe and North America, chaps. 11 and 12..... Cavern deposits and osseous breccias, p. 153..... Fluvio-marine crag of Norwich, p. 148.. Limestone of Girgenti, in Sicily, p. 152. </div> | Three-fourths of the fossil shells of existing species. A majority of the mammalia extinct but the genera corresponding with those now surviving in the same great geographical and sociological province, p. 157. During part of this period icebergs frequent in the seas of the northern hemisphere, and glaciers on hills of moderate height. |

No.

1. *APORRHAIUS PES-PELICANI*. PLIOCENE, *Norfolk.*
2. *ASTARTE BORREALIS*. PLIOCENE, *Sweden.*
3. *NUCULA*. PLIOCENE, *Portland, Maine.*
4. *NUCULA PORTLANDICA*. PLIOCENE, *Portland, Maine.*
5. *SANGUINOLARIA FUSCA*. PLIOCENE, *Portland, Maine.*
6. *UNIO PICTORUM*, MAMMALIAN DEPOSITS, *Valley of Thames.*
7. *VENUS CHIONE*. PLIOCENE, *Astigliani.*

- | | | |
|---------------------|--|--|
| 4. Older Pliocene.. | <div style="display: inline-block; vertical-align: middle;"> <div style="font-size: 3em; vertical-align: middle; margin-right: 5px;">{</div> Red and Coralline crag of Suffolk, p. 162..... Subapennine beds, 166..... </div> | <div style="display: inline-block; vertical-align: middle;"> <div style="font-size: 3em; vertical-align: middle; margin-right: 5px;">}</div> A third or more of the species of Mollusca extinct. Nearly, if not all, the mammalia extinct. </div> |
|---------------------|--|--|
8. *FUSUS CONTRARIUS*, CRAG, *Suffolk.*
 9. *FUSUS SCALARIFORMIS*, PLIOCENE, *Sweden.*

C. MIOCENE GROUP.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|----------------------------|--|--|
| 5. Miocene..... | Faluns of Touraine, p. 168..... Part of Bourdeaux beds, p. 171..... Part of Molasse of Switzerland, p. 171.. | About two-thirds of the species of shells extinct. The recent species of shells often not found in the adjoining seas, but in warmer latitudes. All the mammals extinct. |

No.

1. CANCELLARIA ACUTANGULA? MIOCENE, *Bourdeaux.*
2. CYRENA SUBURATA. MIOCENE.
3. CYTHEREA. MIOCENE, *Bourdeaux.*
4. FUSUS BURDIGALENSIS. MIOCENE. *Bourdeaux.*
5. NATICA VARIABILIS. MIOCENE.
6. PECTUNCULUS. MIOCENE, *Bourdeaux.*
7. SPONDYLUS. MIOCENE, *Astigiani.*
8. STROMBUS ITALICUS. BONELLI. MIOCENE? *Montapa.*
9. TURRITELLA TEREBRATIS. MIOCENE, *Bourdeaux.*

D. EOCENE GROUP.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|----------------------------|---|---|
| 6. Upper Eocene... | Upper marine of Paris basin, Fontainebleau sandstone, p. 175..... Upper freshwater and millstone of same. Kleya Spawen beds, p. 176..... Hermendorf tile-clay, near Berlin..... Mayence tertiary strata, p. 177..... Freshwater beds of Limagne d' Auvergne, p. 181..... | Fossil shells of the Eocene period, with very few exceptions, extinct. Those which are identified with living species rarely belong to neighbouring regions. All the mammals of extinct species, and the greater part of them of extinct genera. Plants of Upper Eocene, indicating a south European or Mediterranean climate; those of Lower Eocene, a tropical climate. |

1. TERTIARY LIMESTONE. *Brunn near Vienna.*
2. CALYPTRÆA TROCHIFORME. EOCENE, *Southampton.*
3. CARDITA ACUTICOSTA. EOCENE, *Paris.*
4. CASSIDULUS. ? EOCENE, *Normandy.*
5. FUSUS BULBIFORMIS. EOCENE, *Paris basin.*
6. HELIX VECTENSIS. UPPER EOCENE, *Isle of Wight.*
7. HIPPOThERIUm GRACILE. TEETH OF: *Eppelsheim near Mayence.*

| | | |
|--------------------|---|---|
| 7. Middle Eocene.. | Paris gypsum with Paleotherium, &c. p. 191..... Freshwater and fluvi-marine beds, of Hadden Hill, Isle of Wight, p. 197... Barton beds, Hants, p. 198..... Calcaire Grossier, Paris, p. 193..... Bagshot and Bracklesham beds, Surrey and Sussex, p. 196..... | Fossil shells of the Eocene period, with very few exceptions, extinct. Those which are identified with living species rarely belong to neighbouring regions. All the mammals of extinct species, and the greater part of them of extinct genera. Plants of Upper Eocene, indicating a south European or Mediterranean climate; those of Lower Eocene, a tropical climate. |
|--------------------|---|---|

8. ACTÆON SIMULUTUS. EOCENE, *Barton.*

No.

9. ANOMIA STRIATA. EOCENE, *Bracklesham*.
10. BALANUS ERISMA. EOCENE, *Isle of Wight*.
11. BUCCINUM CANALICULATUM (FUSUS,) EOCENE, *Barton*.
12. BULIMUS ELLIPTICUS. EOCENE, *Isle of Wight*.
13. CALYPTREA TROCHIFORME. EOCENE, *Barton*.
14. CHAMA SQUAMOSA. EOCENE, *Barton*.
15. CANCER TUBERCULATUS. EOCENE, *Isle of Wight*.
16. CANCELLARIA. EOCENE, *Isle of Wight*.
17. CARDIUM SEMI-GRANULOSUM. EOCENE, *Bracklesham-bay*.
18. CERITHIUM CINCTUM. EOCENE, Upper marine, *Headon-hill, Isle of Wight*.
19. CERITHIUM CONCAVUM. EOCENE, Upper freshwater, East end of *Colwell-bay, Isle of Wight*.
20. CERITHIUM MARGARITACEUM. EOCENE, Upper marine, *Colwell-bay, Isle of Wight*.
21. CORBULA LONGIROSTRUM. EOCENE, *Barton*.
22. CASSIDARIA STRIATA. EOCENE, *Barton*.
23. CRAB.
24. CRAB, FOSSIL. *Sheppey*.
25. CRAB. *Sheppey*.
26. CRAB, *Sheppey*.
27. CRAB, *Sheppey*.
28. CYCLOTUS CINCTUS. EOCENE, *Isle of Wight*.
29. CYRENA OBOVATA. EOCENE, *Isle of Wight*.
30. CYTHEREA INCRASSATA. MIDDLE EOCENE, *Isle of Wight*.
31. RUOMPHALUS DISCUS. UPPER EOCENE, *Isle of Wight*.
32. FRESHWATER LIMESTONE, *Isle of Wight*.
33. FUSUS ACICULATUS. EOCENE, *Barton*.
34. FUSUS LABIATUS. EOCENE, Upper marine, *Colwell-bay, Isle of Wight*.
35. FUSUS LONGÆVUS (VERMIIA CRASSA), London Clay, *Barton*.
36. FUSUS MACILENTUS. EOCENE, *Barton*.
37. FUSUS REGULARIS. SOW : EOCENE, *Barton*.
38. FUSUS ROSTRATUS. EOCENE, *Barton*.
39. LIMNEA GLOBOSULA. EOCENE, *Isle of Wight*.
40. LIMNEA LONGISCATA. EOCENE, *Isle of Wight*.
41. LIMNEA PYRAMIDALIS. EOCENE, *Isle of Wight*.
42. MELANIA LACTEA. EOCENE.
43. MELANOPSIS CARINATUS. EOCENE, *Isle of Wight*.
44. MELANOPSIS FUSIFORMIS. EOCENE, Upper marine, *Headon-hill, Isle of Wight*.

No.

45. *NATICA MUTABILIS*. EOCENE, Upper marine, *Colwell-bay, Isle of Wight*.
46. *NEMATURA PYGMEA*. EOCENE, *Isle of Wight*.
47. *NEMATURA NERITINA*. MIDDLE EOCENE, *Isle of Wight*.
48. *NERITINA CONCAVA*. EOCENE, *Isle of Wight*.
49. *NUCULA DESHAYESII*. EOCENE, *Belgium*.
50. *NUMMULITES LAVIGATA*. EOCENE, *Belgium*.
51. *OSTREA*. MIDDLE EOCENE, *Colwell-bay, Isle of Wight*.
52. *OSTREA TENER*. EOCENE, *Isle of Wight*.
53. *OLIVA BRANDERI*. EOCENE, *Barton*.
54. *PALUDINA LENTA*. EOCENE, *Colwell bay, Isle of Wight*.
55. *PALUDINA THERMALIS*. Freshwater Limestone, *Hochst near Frankfort*.
56. *PHOLADOMYA MARGARITACEA*. EOCENE, *Isle of Wight*.
57. *PHOLADOMYA MARGARITACEA*, London Clay, *Isle of Wight*.
58. *PLANORBIS EUOMPHALUS*. EOCENE, *Isle of Wight*.
59. *PLANORBIS ROTUNDATUS*. EOCENE, *Isle of Wight*.
60. *PLANORBIS ROTUNDATUS*. EOCENE, *Isle of Wight*.
61. *PLEUROTOMA ATTENUATA*. EOCENE, *Bracklesham*.
62. *PLEUROTOMA FILOSA*. EOCENE.
63. *POTAMIDES*. EOCENE, *Isle of Wight*.
64. *POTAMIDES MURICATUS*. EOCENE, Upper Marine, *Headon-hill, Isle of Wight*.
65. *POTAMIDES VENTRICOSUS*. SOW : EOCENE. Upper Marine. *Headon-hill, Isle of Wight*.
66. *POTAMOMYA PLANA*. EOCENE, *Isle of Wight*.
67. *PSAMMOBIA COMPRESSA* ? EOCENE, *Isle of Wight*.
68. *PSAMMOBIA RUGOSA*. EOCENE, *Isle of Wight*.
69. *PSAMMOBIA RUDIS*. SOW : MIDDLE EOCENE, *Isle of Wight*.
70. *ROSTELLARIA FISSINELLA*. EOCENE.
71. *ROSTELLARIA RIMOSA*. EOCENE, *Barton*.
72. *SANGUINOLARIA HOLLOWAYSI* EOCENE, *Bracklesham*.
73. *SERAPHS CONVOLUTUS*. SOW : EOCENE, *Barton*.
74. *STROMBUS BARTONENSIS*. EOCENE, *Barton*.
75. *TRITON ARGUTUS*. SOW : EOCENE, *Barton*.
76. *TRITON FLANDRICUM*. EOCENE, *Belgium*.
77. *TROCHUS MONILIFER*. EOCENE, *Barton*.
78. *TURRITELLA IMBRICATANA*. EOCENE, *Isle of Wight*.
79. *TURRITELLA TEREbella*. EOCENE, *Bracklesham Bay*.
80. *UNIO SOLANDRI*. EOCENE, *Isle of Wight*.
81. *VOLUTA AMBIGUA*. EOCENE, *Barton*.

No.

82. *VOLUTA LUCTATOR*. EOCENE, *Barton*.
 83. *VOLUTA LIMA*. EOCENE, *Barton*.
 84. *VOLUTA SPINOSA*. EOCENE.
 85. *VENERICARDIA (CARDITA) GLOBOSA*. EOCENE, *Barton*.
 86. *VENUS TENUISTRIATA*. EOCENE, *Barton*.

| | | | | |
|-------------------|---|---|---|--|
| s. Lower Eocene.. | { | London clay proper of Highgate Hill and Sheppey,—Bognor beds, Sussex, p. 200..... | } | Fossil shells of the Eocene period, with very few exceptions, extinct. |
| | | Sables inférieurs, and lits coquilliers of Paris basin, p. 196..... | | Those which are identified with living species rarely belong to neighbouring regions. |
| | | Mottled and plastic clays and sands of the Hampshire and London basins, p. 203..... | | All the mammalia of extinct species, and the greater part of them of extinct genera. |
| | | Sables inférieurs, and argiles plastiques of Paris basin, p. 198..... | | Plants of Upper Eocene, indicating a south European or Mediterranean climate; those of Lower Eocene, a tropical climate. |
| | | Nummulitic formation of the Alps, p. 205..... | | |

87. *CASSIDARIA CARINATA*. EOCENE, *Highgate*.
 88. *CERITHIUM*. Plastic clay, LOWER EOCENE, *France*.
 89. *CYRENA CUNEIFORMIS*. EOCENE, *Woolwich*.
 90. FOSSIL RESIN. EOCENE, *Highgate*.
 91. *FUSUS*. EOCENE, *Highgate*.
 92. *MELANIA INQUINATA*. EOCENE, Plastic clay, *Woolwich*.
 93. *MELANOPSIS BUCCINOIDES*. *CYRENA TELLINELLA*. COTTON. Plastic clay, *Woolwich*.
 94. *MODIOLA ELEGANS*. EOCENE, *Highgate*.
 95. *MUREX ASPER*. EOCENE, *Highgate*.
 96. *NAUTILUS CENTRALIS*. EOCENE. *Highgate*.
 97. *NAUTILUS REGALIS*. London clay, *Highgate*.
 98. *NUMMULITES LEVIGATA*. EOCENE. *France*.
 99. *OTODUS OBLIQUUS* (tooth of.), London clay, *Sheppey*.
 100. *OSTREA PULCHRA*. LOWER EOCENE, Plastic clay, *Woolwich, Kent*.
 101. *PECTUNCULUS BREVIROSTRUM*. EOCENE, *Bognor*.
 102. *PETROPHYLLOIDES RICHARDSONI*. EOCENE, *Kent*.
 103. *ROSTELLARIA MACROPTERA*. London clay, *Kingston*.
 104. *TEREDO ANTENNAUTA*. SOW: EOCENE, *Highgate*.
 105. *THRACIA OBLATA*. EOCENE, *Herne Bay*.
 106. *PINNA AFFINIS*. SOW: EOCENE, London clay, *Bognor*.
 107. *VERMETUS BOGNORIENSIS*. London clay, *Bognor*.
 108. *VOLUTA NODOSA*. EOCENE, *Highgate*.
 109. *VOLUTA WETHERELLI* (rare). EOCENE, *Highgate*.

AQUEOUS ROCKS.

II. SECONDARY.

E. CRETACEOUS.

§ UPPER CRETACEOUS.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|----------------------------|--|---|
| 9 Maastricht beds.. | <div> Yellowish white limestone of Maastricht, p. 200..... Coralline limestone of Faxø, Denmark, p. 210..... </div> | Ammonite, Baculite, and Belemnite, associated with Cypræa, Oliva, Mitra, Trochus &c. Large marine saurians. |
| 10 Upper White Chalk..... | White chalk with flints of North and South Downs,—Surrey and Sussex, p. 211..... | Marine limestone formed in part of decomposed corals. |
| 11 Lower White Chalk..... | Chalk without flints, and chalk marl, ibid..... | |
| 12 Upper Greensand | <div> Loose sand, with bright green particles, ibid..... Firestone of Merstham, Kent, p. 218.... Marlstone, with layers of chert, south of Isle of Wight..... </div> | |
| 13 Gault.... | Dark blue marl at base of chalk escarpment,—Kent and Sussex, p. 218..... | Numerous extinct genera of conchiferous cephalopoda—Hamite, Scaphite, Ammonite, &c. |

§§ LOWER CRETACEOUS.

| | | |
|--------------------|--|--|
| 14 Lower Greensand | <div> Sand with green matter,—Weald of Kent of Sussex, p. 219..... White, yellowish, and ferruginous sand, with concretions of limestone and chert,—Atherfield, Isle of Wight.... Limestone called Kentish Red..... </div> | Species of shells &c. nearly all distinct from those of Upper Cretaceous; most of the genera the same. |
|--------------------|--|--|

| | | |
|---------------------|--|---|
| 9 Maastricht beds.. | <div> Yellowish white limestone of Maastricht, p. 200..... Coralline limestone of Faxø, Denmark, p. 210..... </div> | Ammonite, Baculite, and Belemnite, associated with Cypræa, Oliva, Mitra, Trochus &c. Large marine saurians. |
|---------------------|--|---|

No.

1. DITRUPA. Chalk, *Maastricht*.
2. OSTREA. Chalk, *Maastricht*.
3. PAGURUS FAUJASII, DESMAREST. Chalk marl, (*Hanover*) and *Maastricht*.

| | | |
|---------------------------|--|---|
| 10 Upper White Chalk..... | White chalk with flints of North and South Downs,—Surrey and Sussex, p. 211..... | Marine limestone formed in part of decomposed corals. |
|---------------------------|--|---|

4. ANANCHYTES OVATUS. Chalk, *Kent*.
5. ANANCHYTES OVATUS. Upper Chalk, *Kent*.
6. BACULITES FAUJASII. Upper Chalk, *Normandy*.
7. BELEMNITES MUCRONATUS. Upper Chalk, *Norfolk*.
8. CIDARIS CLAVIGERA. Chalk, *Bromley*.
9. CIDARIS VESICULOSA. Upper Chalk, *Kent*.

No.

10. *CIDARIS VESICULOSA*. Upper Chalk, *Kent*.
11. *CIDARIS VESICULOSA*. Chalk, *Kent*.
12. *CONULUS VULGARIS*. Chalk, *Kent*.
13. *CONULUS SUBROTUNDUS*. Chalk, *Kent*.
14. *CONULUS SUBROTUNDUS*. Upper Chalk, *Kent*.
15. *CYPHOSOMA MILLERI*. Upper Chalk, *Kent*.
16. *HOLASTER PILULA*. Chalk, *Sussex*.
17. *INOCERAMUS BRONGNIARTII*. Chalk, *Sussex*.
18. *INOCERAMUS CUVIERI*. Upper Chalk, *Kent*.
19. *INOCERAMUS*. Chalk, *Kent*.
20. *MILLEPORA CORYMBOSA*. *Caen*.
21. *MILLEPORA GLOBULARIS*. Chalk, *Kent*.
22. *MICRASTER COR-ANGUINUM*. Chalk, *Kent*.
23. *MICRASTER ROSTRATUS* VAR : OF *S. COR-ANGUINUM*. Chalk, *Kent*.
24. *OSTREA SEMIPLANA*. Chalk, *Norfolk*.
25. *PECTEN 5 COSTATUS*. Upper Chalk, *Kent*.
26. *PECTEN MEMBRANACEUS*, Niln, Mont. ST. PIERRE, (rare) terre crétace.
27. *PTYCHODUS LATIOR* OR *ALTIOR*. Chalk, *Kent*.
28. *SERPULA MACROPUS*. Chalk, *Kent*.
29. *SERPULA*. CIPLY near Mons, Chalk.
30. *SERPULA*. CIPLY near Mons, Chalk.
31. *SPONDYLUS SPINOSUS*. Upper Chalk. *Sussex*.
32. *SPONDYLUS SPINOSUS (PLAGIOSTOMA)*. Upper Chalk.
33. *SPONDYLUS*. Upper Chalk.
34. *SPONDYLUS*. Upper Chalk.
35. *TEREBRATULA CARNEA*. Sow : Upper Chalk, *Kent*.
36. *TEREBRATULA CARNEA*. Chalk.
37. *TEREBRATULA NERVIENSIS*. Chloritic Chalk, *Tournay, Belgium*.
38. *TEREBRATULA Plicatulus*. Upper Chalk, *Kent*.
39. *TEREBRATULA SEMIGLOBOSA*. Chalk, *Kent*.
40. *TEREBRATULA SEMIGLOBOSA*. Chalk, *Mendon Paris*.
41. *VENTRICULITES*. Chalk, *Kent*.
42. *VENTRICULITES*, IN FLINT. Upper Chalk, *Kent*.
43. *VENTRICULITES SIMPLEX*. Middle Chalk.

11 Lower White { Chalk without flints, and chalk marl, }
 Chalk..... { Surrey and Sussex, p. 211..... }

44. *BELEMNITES LANCEOLATUS*. Lower Chalk.
45. *BELEMNITES DILATATUS*. Lower Chalk, *Castellano (Basses Alpes)*.

No.

46. *BERYX ORNATUS*. Lower Chalk, *Kent*.
47. *DISCOIDEA SUBUCULUS*. Chalk Marl, *Hessia*.
48. FISH, HEAD OF. Lower Chalk, *Cambridge*.
49. *GALERITES VULGARIS*. Chalk, *Kent*.
50. *HOLASTER PLANUS*. (*SPATANGUS*). Lower Chalk, *Kent*.
51. *HOLASTER SUBGLOBOSA*. (*SPATANGUS*). Lower Chalk, *Wiltshire*.
52. *INOCERAMUS ANNULATUS*. Lower Chalk, *Kent*.
53. *INOCERAMUS PLANUS*. Lower Chalk.
54. *OSTREA*. Lower Chalk, *Sussex*.
55. *PECTEN BEAVERI*. Lower Chalk, *Kent*.
56. *PECTEN LAMINOSUS*. Lower Chalk, *Sussex*.
57. *PLICATULA PECTINOIDES*. Lower Chalk, *Kent*.
58. *SERPULA HELICIFORMIS*. Chalk Marl, *Hessia*.
59. *SCAPHITES EQUALIS*. Lower Chalk.
60. *SPHÆRULITES*. Cretaceous, *Lisbon*.
61. *TEREBRATULA SUBUNDATA*. Lower Chalk, *Dorsetshire*.
62. *TEREBRATULA SEMIGLOBOSA*. Lower Chalk, *Wiltshire* and *Kent*.
63. *TURRILITES*. Lower Chalk, *Wiltshire*.
64. *VENTRICULITES*. Lower Chalk, *Kent*.

12 Upper Greensand { Loose sand, with bright green particles,
Surrey and Sussex, p. 211.....
Firestone of Merstham, Kent, p. 218.....
Marlstone, with layers of chert, south
of Isle of Wight. }

65. *ACHILLEUM VOLUTA*. Alpine formation.
66. *AMMONITES VARICOSUS*. Greensand, *Blackdown*.
67. *AMMONITES VARICOSUS*. Greensand, *Blackdown*.
68. *CUCULLEA CARINATA*. Upper Greensand, *Blackdown, Devonshire*.
69. *CYPRINA ANGULATA*. Upper Greensand, *Devizes, Wiltshire*.
70. *CYPRINA ANGULATA*. Greensand, *Blackdown*.
71. *DISCOIDIA SUBUCULUS*. Upper Greensand, *Warminster*.
72. *EXOGYRA CONICA*. Upper Greensand.
73. *INOCERAMUS CONCENTRICUS*. Upper Greensand, *Blackdown, Devon*.
74. *PECTEN QUADRICOSTATUS*. Upper Greensand, *Blackdown*.
75. *PECTUNCULUS UMBONATUS*. Upper Greensand, *Blackdown, Devon*.
76. *SIPHONIA PYRIFORMIS*. Greensand, *Blackdown*.
77. *SPATANGUS CURVIATUS*. *Heiliginstadt*.
78. SPONGES.
79. SPONGES. Greensand, *Farringdon*.

No.

80. SPONGES. *Farringdon*.
 81. VERMICULARIA CONCAVA. Upper Greensand.
 82. VENUS CAPERATA. SOW: Greensand, *Blackdown*.

13 Gault..... { Dark blue marl at base of chalk escarp- } Numerous extinct genera of conchi-
 ment,—Kent and Sussex, p. 216. } ferous cephalopoda. Hamite, Sea-
 phite, Ammonite, &c.

83. AMMONITES INFLATUS VAR: Gault, *Cambridge*.
 84. AMMONITES BRUDANTII. Gault, *Escraguolles*.
 85. AMMONITES SERRATUS. Gault, *Folkstone*.
 86. AVICULA GRYPHÆOIDES. Gault, *Cambridge*.
 87. DENTALIUM ELLIPTICUM. Gault, *Cambridge*.
 88. HAMITES MAXIMUS. Gault, *Folkstone*.
 89. INOCERAMUS CONCENTRICUS. Gault, *Kent*.
 90. INOCERAMUS SULCATUS, SOW: Gault, *Kent*, *Folkstone*.
 91. PLICATULA PECTINOIDES. Gault, *Cambridge*.
 92. SOLARIUM ——— ? Gault, *Cambridge*.
 93. SOLARIUM ORNATUM. Gault, *Cambridge*.
 94. TEREBRATULA BIPPLICATA. Gault, *Cambridge*.
 95. TEREBRATULA SULCATA. Park Gault, *Cambridge*.
 96. TEREBRATULA OBTUSA. SOW: Gault, *Cambridge*.
 97. TROCHOCYATHUS. Gault, *Cambridge*.
 98. TROCHOCYATHUS. Gault, *Cambridge*.

14 Lower Greensand { Sand with green matter,—Weald of } Species of shells &c. nearly all dis-
 Kent and Sussex, p. 219. } tinct from those of Upper Creta-
 White, yellowish, and ferruginous sand, } ceous; most of the genera the
 with concretions of limestone and } same.
 chert,—Atherfield, Isle of Wight.... }
 Limestone called Kentish Red. }

ROCKS.

99. CYCLAS LIMESTONE. *Rostenblat* near *Toplitz*.
 100. FERRUGINOUS SAND. *Hampstead*.
 101. GREENSAND. (IRON SAND) from the *Cave Farnham*.
 102. GREENSAND WITH FOSSILS.
 103. MARLS. *Southward*, *Essex*.
 104. WHITEY SANDS. *Isle of Wight*.

FOSSILS.

105. ARCA RAULINI. Lower Greensand, *Isle of Wight*.
 106. ASTACUS VECTENSIS. Lower Greensand, *Isle of Wight*.
 107. ASTACUS VECTENSIS. Lower Greensand, *Isle of Wight*.

No.

108. *PANOPŒA PLICATA*. Lower Greensand, *Isle of Wight*.
 109. *TURRITELLA* &C. Lower Greensand, *Isle of Wight*.
 110. *GERVILLIA AVICULOIDES*. Lower Greensand.
 111. *GERVILLIA AVICULOIDES*. (*TURRITELLA GRANULATA*) Greensand, *Blackdown*.
 112. *GERVILLIA LINGULOIDES*. Lower Greensand.
 113. *NAUTILUS UNDULATUS*. Lower Greensand.
 114. *PECTEN INTERSTRIATUS*. Lower Greensand.
 115. *PANOPŒA PLICATA*. Lower Greensand.
 116. *SERPULA*. Lower Greensand.
 117. *TEREBRATULA SELLA*. SOW : Lower Greensand.
 118. *TEREDINA* IN WOOD. Lower Greensand, *Maidstone*.
 119. *THETIS MINOR*. Lower Greensand.

F. WEALDEN.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|---|---|---|
| 13 Wealden Clay.... | { Clay with occasional bands of limestone,—Weald of Kent, Surrey, and Sussex, p. 227. } | { Of fresh water origin, shells of pulmoniferous mollusca and of Cypris. Land reptiles. } |
| 1. <i>BUFONITES</i> (FISH PALATES). Wealden, <i>Kent</i> . | | |
| 2. <i>CYCLAS MEDIA</i> . Wealden, <i>Tonbridge wells</i> . | | |
| 3. <i>CYPRIS VALDENSIS</i> . Wealden, <i>Isle of Wight</i> . | | |
| 4. <i>CYPRIS VALDENSIS</i> . Wealden. | | |
| 5. <i>CYPRIS VALDENSIS</i> . Wealden. | | |
| 6. <i>LONCHOPTERIS MANTELLI</i> . Wealden. | | |
| 7. <i>UNIO GAULTERI</i> . (<i>CYCLAS MEDIA</i>). Wealden, <i>Sussex</i> . | | |
| 8. <i>UNIO GAULTERI</i> &C. Wealden, <i>Tonbridge wells</i> . | | |

G. OOLITE.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|----------------------------|---|--|
| 18 Upper Oolite | { a. Portland building stone, p. 259. b. Portland sand. c. Kimmeridge clay, Dorsetshire, p. 260. d. Coral Rag, p. 260. Calcareous free-stones, Oolite, often full of Corals. Oxfordshire..... } | Ammonites and Belemnites numerous. Large saurians, as <i>Pterodactyles</i> , <i>Plesiosaurs</i> , <i>Ichthyosaurs</i> . No cetaceans yet known, but three species of terrestrial mammals, p. 267, 268. Preponderance of ganoid fish. The plants chiefly cycads, conifers, and ferns, with a few palms. |
| 19 Middle Oolite.... | { a. Cornbrash and forest marble, Wiltshire, p. 263..... b. Oxford clay—Dark blue clay—Oxfordshire and midland counties, p. 263..... } | |
| 20 Lower Oolite . . | { a. Cornbrash and forest marble, Wiltshire, p. 263..... b. Great Oolite and Stonesfield slate, Bath, Bradford, Stonesfield near Woodstock, Oxfordshire, p. 266..... c. Fuller's earth,—clay containing fuller's earth near Bath, p. 272..... d. Inferior Oolite, calcareous freestone, and yellow sands,—Cotteswold Hills, Dundry Hill, near Bristol, p. 272..... } | |
| | | |

No.

| | | |
|---------------------|--|---|
| 13 Upper Oolite.... | $\left\{ \begin{array}{l} a. \text{ Portland building stone, p. 259,} \\ b. \text{ Portland sand.....} \\ c. \text{ Kimmeridge clay, Dorsetshire, p. 260.} \end{array} \right.$ | Ammonites and Belemnites numerous. Large saurians, as Pterodactyles, Plesiosaurs, Ichthyosaurs. No cetaceans yet known, but three species of terrestrial mammalia, p. 267, 268. Preponderance of ganoid fish. The plants chiefly cycads, conifers, and ferns, with a few palms. |
|---------------------|--|---|

ROCKS.

1. IRON OOLITE, *Wurtemberg*.
2. UPPER JURA. Limestone, *Bayreuth*.

FOSSILS.

3. AMMONITES BIPLEX. OOLITE, *Portland*.
4. AXINUS OBSCURUS, *Kimmeridge Clay*.

| | | |
|----------------------|---|---|
| 19 Middle Oolite.... | $\left\{ \begin{array}{l} a. \text{ Coral Rag, p. 260. Calcareous free-stones. Oolite, often full of Corals. Oxfordshire.....} \\ b. \text{ Oxford clay—Dark blue clay—Oxfordshire and midland counties, p. 262....} \end{array} \right.$ | Ammonites and Belemnites numerous. Large saurians, as Pterodactyles, Plesiosaurs, Ichthyosaurs. No cetaceans yet known, but three species of terrestrial mammalia, p. 267, 268. Preponderance of ganoid fish. The plants chiefly cycads, conifers, and ferns, with a few palms. |
|----------------------|---|---|

a. CORAL RAG.

5. ASTREA LIMBATA. Coral Rag, *Nattheim, Wurtemberg*.
6. ASTARTE OVATA. Coral Rag, *Wiltshire*.
7. CERIOPORA RADICIFORMIS. Coral Rag, *Engelhardsberg*.
8. CIDARIS BLUMENBACHII. Coral Rag, *Wiltshire*.
9. CIDARIS CRENULARIS. (Hemicidaris,) Coral Rag, *Wiltshire*.
10. CORAL RAG. *Malton, Yorkshire*.
11. LITHODOMUS INCLUSUS. Coral Rag, *Wiltshire*.
12. NUCLEOLITES CLUNICULARIS. Coral Rag, Oolite, *Wiltshire*.
13. PECTEN LEVIS? SOW: Coral Rag.
14. PENTACIMITES PENTAGONALIS, Coral Rag, *Engelhardsberg; Franconia*.
15. TEREBRATULA BIPPLICATA. Coral Rag, *Streitberg*.
16. PECOPTERIS TENUIS. Oolite Shale, *Yorkshire*.
17. PTEROPHYLLUM COMPTUM. Oolite, *Yorkshire*.
18. PTEROPHYLLUM COMPTUM. Oolite Shale, *Scarborough*.
19. AMMONITES CALLOVIENSIS. Kelloway Rock, *Wiltshire*.
20. TEREBRATULA ORNITHOCEPHALA. Shewing the arms of, Kelloway, Rock, Oolite, *Wiltshire*.

b. OXFORD CLAY.

21. AMMONITES BRIGHTII. Oxford Clay, *Wiltshire*.
22. AMMONITES COMPTONI. Oxford Clay, *Wiltshire*.
23. AMMONITES COMPTONI. Oxford Clay, *Wiltshire*.
24. AMMONITES ELIZABETHÆ. Oxford Clay, *Wiltshire*.
25. AMMONITES ELIZABETHÆ. Oxford Clay, *Wiltshire*.

No.

26. AMMONITES EXCAVATES. Oxford Clay, *Cambridgeshire*.
 27. AMMONITES HECTICUS. Oxford Clay, *Franconia*.
 28. AMMONITES LAMBERT. Oxford Clay, *Lannoy, Ardennes*.
 29. AMMONITES VERTEBRALIS. Oxford Clay, *Scarborough*.
 30. PANOPŒA GIBBOSA. Oxford Clay.
 31. ROSTELLARIA. Oxford Clay, *Wiltshire*.

- | | | | |
|---------------------|---|---|--|
| 20 Lower Oolite.... | { | a. Cornbrash and forest marble, Wiltshire, p. 263..... | } Ammonites and Belemnites numerous. Large saurians, as Pterodactyles Plesiosaurs, Ichthyosaurus. No cetaceans yet known, but three species of terrestrial mammals, p. 247, 268. Preponderance of ganoid fish. The plants chiefly cycads, conifers, and ferns, with a few palms. |
| | | b. Great Oolite and Stonefield slate, Bath, Bradford, Stonefield near Woodstock, Oxfordshire, p. 266. | |
| | | c. Fuller's earth—clay containing fuller's earth near Bath, p. 272..... | |
| | | d. Inferior Oolite, calcareous freestone, and yellow sand,—Cotteswold Hills, Dundry Hill, near Bristol, p. 272..... | |

a. CORNBRASH.

32. NUCLEOLITES DEPRESSUS. Cornbrash, *Wiltshire*.
 33. OSTREA MARSHII. Cornbrash.
 34. TEREBRATULA INTERMEDIA. Cornbrash, *Wiltshire*.
 35. TEREBRATULA LAGENALIS. Cornbrash, *Wiltshire*.
 36. TEREBRATULA OBOVATA. Cornbrash, *Wiltshire*.

b. GREAT OOLITE.

37. ASTARTE RHOMBOIDALIS. Great Oolite.
 38. GERVILLIA ACTUA. Great Oolite, *Callyweston*.
 39. MODIOLA IMBRICATA. Great Oolite.
 40. TEREBRATULA INTERMEDIA. BROYZON. Great Oolite, *France*.
 41. TEREBRATULA MAXILLATA. Great Oolite, *Oxfordshire*.
 42. TEREBRATULA ORBICULARIS. Great Oolite, *Wiltshire*.

b. BRADFORD CLAY.

43. APIOCRINUS ROTUNDUS. Bradford Clay, *Wiltshire*.
 44. OSTREA COSTATUS. Bradford Clay, *Bavelliers by Belfort*.
 45. TEREBRATULA COARCTATA. Bradford Clay, *Wiltshire*.

c. FULLERS EARTH.

46. TEREBRATULA ORNITHOCEPHALA. Fullers Earth, *Wiltshire*.
 47. TEREBRATULA ORNITHOCEPHALA. Fullers Earth, *Wiltshire*.
 48. TEREBRATULA VARIANS. Fullers Earth, *Wiltshire*.

d. INFERIOR OOLITE.

49. AMMONITES PARKINSONI. Inferior Oolite.
 50. ASTARTE ELEGANS. Inferior Oolite.
 51. ASTARTE ELEGANS. Inferior Oolite, *Bayeux*.
 52. ASTARTE MODIOLARIS. Inferior Oolite, *Bridport*.
 63. BELEMNITE shewing Alveolus. Inferior Oolite.

No.

54. DISCOIDRA HEMISPHERICA. Inferior Oolite.
55. PLEUROTOMARIA ORNATA. Inferior Oolite, *Bridport*.
56. TEREBRATULA ——— ? Inferior Oolite, *Strand*.
57. TEREBRATULA ANGULATA. Inferior Oolite, *Cheltenham*.
58. TEREBRATULA VULLATA. Inferior Oolite, *Pyrenees*.
59. TEREBRATULA CORNUTA. Marlstone, *Ilminster, Somerset*.
60. TEREBRATULA CYNOCEPHALA. Inferior Oolite, *Glostershire*.
61. TEREBRATULA FIMBRIA. Inferior Oolite, *Glostershire*.
62. TEREBRATULA PEROVALIS. Inferior Oolite, *Cheltenham*.
63. TEREBRATULA SPINOSA. Inferior Oolite, near *Bath*.
64. TEREBRATULA SPHEROIDALIS. Marlstone, *Somerset*.
65. VERMETUS CONCINNUS. Inferior Oolite, *Yorkshire*.

N. LIAS.

- 21 Lias..... { Argillaceous limestone, marl and clay, } Mollusca, reptiles, and fish of genera
 —Lyme Regis, Dorsetshire, p. 273. } analogous to the Oolite.

ROCKS.

1. LIAS MARL, containing remains of Saurian, *Mistelgau near Bayreuth*.
2. LIAS MARL, *Wurtemberg*.
3. LIAS.

FOSSILS.

4. ACHODUS NOBILIS. Lias, *Lyme Regis*.
5. AMMONITE. Lias, Clay Ironstone.
6. AMMONITES BIFRONS. Lias, *Somerset*.
7. AMMONITES BIFRONS ? Lias, *Somerset*.
8. AMMONITES BIRCHII. Section of, Lias, *Lyme*.
9. AMMONITES COSTATUS. Lias, *Banz, Franconia*.
10. AMMONITES WALCOTTI. Lias, *Whitby, Yorkshire*.
11. (AMPHIDESMA) PANOPŒA DONACIFORME. PHILLIPS. Lias, *Lincolnshire*.
12. AVICULA LONGICOSTATA, STUTCHBURY. Loudon's Mag. Nat. Hist. New series vol. 3, p. 163.
13. BELEMNITES DIGITALIS. Lias marl, *Bayreuth*.
14. COPROLITES. Lias, *Lyme Regis*.
15. GRYPHŒA CYMBRIUM. *Goppingen. Wurtemberg*.
16. GRYPHŒA INCURVA. Lias near *Bath*.
17. HYBODUS BECHEI. Lias, *Lyme Regis*.
18. ICHTHYOSAURUS. Lias, *Lyme Regis*.
19. ICHTHYOSAURUS. Teeth of, Lias, *Lyme Regis*.
20. ICHTHYOSAURUS. Paddle of, Lias, *Lyme Regis*.
21. ICHTHYOSAURUS. Part of paddle of, BLUE Lias, *Lyme Regis*.

No.

22. LIMA GIGANTEA. Lias, *Cheltenham*.
 23. NUCULA OVUM. Lias, *Lincoln*.
 24. OPHIURA KERTONI. Lias, *Lyme Regis*.
 25. OPHIURA. RAY OF, Lias, *Whitby*.
 26. Pecten. Lias, Middle Jura, *Khoraschorra, Mozorr*.
 27. Pecten EQUIVALVIS. SOW : Lias, *Somerset*.
 28. SPIRIFER ROSTRATUS. DEBUSH. Lias, *Puyserien*.
 29. TEREBRATULA FURCILLATA. Lias, *Somerset*.
 30. TEREBRATULA NUMISMALIS. Lias, *France*.
 31. TEREBRATULA TETRAHEDRA. Lias, *Somerset*.

I. TRIAS.

| | | |
|--------------------------------------|---|--|
| 22 Upper Trias.... | { Keuper of Germany or variegated marls —Red, grey, green, blue and white marls and sandstone with gypsum— Wirttemberg, bone-bed of Axmouth Dorset, p. 289..... | { Batrachian reptiles, e. g. Labrin- thodon, Rhynchosaurus, &c. Cepha- lopoda: Ceratites. No Belemnites. Plants. Ferns, Cycads, Conifers. |
| 23 Middle Trias or Muschelkalk... | { Compact greyish limestone with beds of dolomite and gypsum.—North of Ger- many, p. 287. Wanting in England.. | { With Equisetites and Calamite. |
| 24 Lower Trias.... | { Variegated or Bunter sandstone of Ger- many. Red and white spotted sand- stone with gypsum and rock salt, p. 288. Part of New Red sandstone of Cheshire with rock salt, p. 294..... | { Plants different for the most part from those of the Upper Trias. |

22. UPPER TRIAS.

1. NEW RED SANDSTONE, *Sangerhausen*.
2. KEUPER SANDSTONE, *Stuttgart*.
3. NOTOSAURUS MIRABILIS. (Trias).

23. MIDDLE TRIAS.

ROCK

4. CRYSTALLINE MUSCHELKALK, *Budlocherberg* near *Bayreuth*.
5. LOWER MUSCHELKALK. *Wellen balt, Rehebach, Heidelberg*.

FOSSILS.

6. AVICULA SOCIALIS, *Mytilus socialis*, Superior Muschelkalk, *Lame-
tarberg* near *Bayreuth*.
7. BUCCINUM CORRUGATUM, Muschelsand *Parma*.
8. CYTHERIUM CINCTUM. Muschelsand *Alzei*,
9. CERATODUS GULIELMI. (Trias), Muschelkalk.
10. DRACOSAURUS BRONNII. (Trias), Muschelkalk.
11. ENCRINUS LILLIFORMIS. Muschelkalk (rare) *Germany*.
12. ENCRINUS LILLIFORMIS. Muschelkalk, *Newstadt, Bavaria*.
13. ICHTHYOSAURUS. Fragments of bone of, Keuper, *Hohenhain, Stuttgart*.
14. LYCOPODIOLITES ARBORENS. Keuper marl with, *Coburg*.
15. LYNODON TRIGONOLITES (VULGARIS.) Superior Muschelkalk,
Bayreuth.
16. MYACITIS ELONGATUS. Superior Muschelkalk, *Bayreuth*.
17. MYOPHORIA VULGARIS. (Trias), Muschelkalk, *Germany*.

AQUEOUS ROCKS.

IV. PRIMARY.

K. PERMIAN.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|----------------------------|---|--|
| 25 Upper Permian. | { Yellow magnesian limestone, Yorkshire and Durham, p. 301..... { Zechstein of Thuringia, Upper part of Permian beds, Russia..... | Organic remains, both animal and vegetable, more allied to primary than to secondary periods |
| 26 Lower Permian. | { a. Marl slate of Durham and Thuringia. { b. Lower New Red sandstone of north of England and Rothliegendes of Germany. { a. and b. Lower part of Permian beds, Russia, p. 301..... | Thecodont saurians, Heterocercal fish of genus <i>Palæoniscus</i> , &c. |

25. UPPER PERMIAN.

ROCKS.

No.

1. BITUMINOUS MARL SLATE. *Eisleben.*
2. CAVERNOUS MAGNESIAN LIMESTONE. *Eisleben.*
3. EARTHY SWINSTONE. *Eisleben.*
4. ZECHSTEIN formation Limestone. *Gera, Thuringia.*

FOSSILS.

5. FENESTELLA VIRGULIFERA. Permian, *Humbleton hill.*
6. PRODUCTUS ACULEATUS. Zechstein marl.

26. LOWER PERMIAN.

7. PECTEN PUSILLUS. Permian, *Durham.*
8. PALÆONISCUS FRIKSLEBKNI. Permian, *Thuringia.*

L. CARBONIFEROUS.

| <i>Periods and Groups.</i> | <i>Examples.</i> | <i>Observations.</i> |
|-----------------------------|---|--|
| 27 Coal measures .. | { a. Strata of sandstone and shale with beds of coal.—S. Wales and Northumberland, p. 309..... { b. Millstone grit.—S. Wales, Bristol coal-field, Yorkshire, p. 308. | Great thickness of strata of fluviomarine origin, with beds of coal of vegetable origin, based on soils retaining the roots of trees. Oldest of known reptiles of <i>Archegosaurus</i> , <i>Sauroid</i> fish. |
| 28 Mountain limestone. | { Carboniferous or mountain limestone, with marine shells and corals..... { Mendip Hills, and many parts of Ireland, p. 340..... | Brachiopoda of genus <i>productus</i> . Cephalopoda of genera <i>Cyrtoceras</i> , <i>Goniatite</i> , <i>Orthoceras</i> . Crustaceans of the genus <i>Phillipsia</i> . Crinoidians abundant. |
| 27 Coal measures .. | { a. Strata of sandstone and shale, with beds, of coal.—S. Wales and Northumberland; p. 309..... { b. Millstone grit.—S. Wales, Bristol coal-field, Yorkshire, p. 308..... | Great thickness of strata of fluviomarine origin, with beds of coal of vegetable origin, based on soils retaining the roots of trees. Oldest of known reptiles of <i>Archegosaurus</i> , <i>Sauroid</i> fish. |

No.

ROCKS.

1. ANTHRACITE, *Shenfield*.
 2. COAL SANDSTONE, *Glasgow*.
 3. BROWN COAL SANDSTONE, *Rorschach, Bodensee*.
 4. BITUMINOUS SHALE OR COAL, *Torbane hill, Scotland*. This substance was recently made the subject of trial in the *Scotch Courts*, as to whether it should be considered coal or not.
 5. CYCLOPTERIS FLABELLIFORMIS. Ironstone of Coal measures.
 6. MEGALICHTHYS HIBBERTI. Coal shale with jaw tooth of the, *Carlisle*.
 7. MEGALICHTHYS HIBBERTI. Scales of the, *Carlisle*.
 8. MEGALICHTHYS HIBBERTI. Coal shale with palatal tooth of the, *Carlisle*.
 9. MEGALICHTHYS HIBBERTI. Portion of the large scale of the, *Carlisle, Lanarkshire*.
 10. NEUROPTERIS LOSHII. Coal measures, Nodule of Ironstone, *Coalbrook Dale*.
 11. ORBICULA. Coal measures, near *Glasgow*.
 12. PECOPTERIS. Coal measures, *Spain*.
 13. PECOPTERIS. Coal measures, *Spain*.
 14. PECOPTERIS ASPHIDOIDES. Coal measures, *Newcastle*.
 15. PECOPTERIS CISTII. Coal measures, *Newcastle*.
 16. PECOPTERIS CYATHEA. Coal measures.
 17. PECOPTERIS CYATHEA ? Coal measures.
 18. PECOPTERIS MILTONI AND NEUROPTERIS spec. Coal measures, *Newcastle*.
 19. PECOPTERIS MURICATA. Coal measures, *Durham*.
 20. PECOPTERIS PLUMOSA. Coal measures, *Newcastle*.
 21. PECOPTERIS POLYMORPHA. Coal measures, *Newcastle*.
 22. PECOPTERIS POLYMORPHA. Coal measures, *Newcastle*.
 23. PECOPTERIS SERLII. Coal measures, *Newcastle*.
 24. PENTREMITES FLOREALIS. Carboniferous, *America*.
 25. SIGILLARIA. Coal measures. T. A. K. 1839.
 26. SIGILLARIA.
 27. SPHENOPTERIS ELEGANS. Coal measures, *Waldenberg*.
 28. SPHENOPTERIS TRIFOLIATA. Coal measures, *Newcastle*.
 29. TRIGONOCARPUM NÖGGERATHII. Peel Quarry, *Wortley*. Coal measures, *Lancashire*.
-

| | | |
|----------------------------|---|--|
| 28 Mountain Limestone..... | { Carboniferous or mountain limestone, with marine shells and corals..... Mendip Hills, and many parts of Ireland, p. 346..... | { Brachiopoda of genus productus. Cephalopoda of genera Cyrtoceras, Goniatite, Orthoceras. Crustaceans of the genus Phillipsia. Crinoidians abundant. |
|----------------------------|---|--|

ROCKS.

No.

30. MOUNTAIN LIMESTONE. *Glasgow.*
 31. MOUNTAIN LIMESTONE. *Ruppersdorf, Bohemia.*

FOSSILS.

32. CYATHOCRINITIS RUGOSA. Mountain Limestone, *Carlisle.*
 33. COCHLIODUS. Mountain Limestone, *Bristol.*
 34. ENCRINITIS LIMESTONE.
 35. EUOMPHALUS PENTANGULATUS. Carb. Limestone, *Ireland.*
 36. NATICOPSIS PHILLIPSII. Carb. Limestone, *Cork, Ireland.*
 37. NUCULA. Mountain Limestone, *Carlisle.*
 38. ORTHIS RESUPINATA. Carb. Limestone, *Derbyshire.*
 39. PECTEN GRANOSUS? Carb. Limestone, *Ireland.*
 40. PRODUCTUS MARTINI. Mountain Limestone, *Carlisle.*
 41. SPIRIFER STRIATUS. Carb. Limestone.

M. DEVONIAN.

| | | |
|--------------------|---|---|
| 29 Upper Devonian. | { a. Yellow sandstone of Dura Den, Fife. b. Red sandstone and marl with cornstone of Herefordshire and Forfarshire. Paving and roofing-stone, Forfarshire. Upper part of Devonian beds of south Devon..... | { Tribe of fish with hard coverings like Chelonians, Pterichthys, Pemptractus, &c., also of genera Cephalaspis, Holopsichius, &c. No reptiles yet known. |
| 30 Lower Devonian. | { Grey sandstone with Ichthyolite, Caithness, Cromarty, and Orkney. Lower part of Devonian beds of South Devon, and green chloritic slates of Cornwall, limestone of Gerolstein, Eifel, | { Fish, partly of same genera, but of distinct species from those in Upper Devonian; also Osteolepis, Coccolepis, Glyptolepis, Dipterus, &c. |

29. UPPER DEVONIAN.

1. ASTRÆA. Species Devonian, *Torquay.*
 2. ASTRÆA HELIANTHOIDES. Devonian, *Boulogne.*
 3. BELLEROPHON. Devonian, *Spain.*
 4. CYATHOPHYLLUM CUESPITOSUM. Devonian system, *Bensberg near Cologne.*
 5. GONIATITIS INTUMESCENS. *Beyrich, Nassau.*
 6. PHACOPS LACINIATUS. Devonian, *France.*
 7. PTERICTHYS QUADRATUS. Devonian, *Scotland.*
 8. SPIRIFER. Devonian, *Spain.*
 9. SPIRIFER PELLICUS. Devonian, *Spain.*
 10. SPIRIFER VERNEULLII, shewing interior. Devonian, *France.*
 11. TURRITELLA CORONATA. Devonian superior, *Paffrath.*
 12. TRIGINOTRELA OSTEOLOATA. Devonian superior, *Gerolstein.*

No.

30. LOWER DEVONIAN.

13. *CALCEOLA SANDALINA*. Devonian, *Eifel*.
14. *CLYMENIA LEVIGATA*. Devonian, *Eifel*.
15. *COCCOSTEUS*. Devonian, *Scotland*.
16. *FENESTELLA ANTIQUA*. Devonian, *Cornwall*.
17. *HOMALONOTUS DELPHINOCEPHALUS*. Devonian, *Eifel*.
18. *MACROCHEILUS ARCULATUS*. Devonian, *Eifel*.
19. *MEGALODON CUCULLATUS*. Devonian, *Eifel*.
20. *ORTHIS*. Devonian, *Eifel*.
21. *OSTEOLEPIS*. Devonian.
22. *OSTEOLEPIS*. Devonian, *Scotland*.
23. *OSTEOLEPIS MAJOR*. Devonian, *Scotland*.
24. *PHACOPS MACROPTALMUS*. Devonian, *Eifel*.
25. *SPIRIFER CANALIFERA*. *S. OSTIOLATA*? Devonian, *Eifel*.
26. *SPIRIFER VERNEULLI*. Devonian.
27. —————? Devonian.
28. *STRIGOCEPHALUS BURTINI*. Devonian, *Eifel*.
29. *TEREBRATULA ASPERA*. Devonian, *Eifel*.
30. *TEREBRATULA CONCENTRICA*. Devonian, *Eifel*.
31. *TEREBRATULA FERITA* AND *SPIRIFER HETEROCLYTUS*. Devonian, *Eifel*.
32. *TEREBRATULA RETICULARIS*, VAR : *aspera*. Devonian, *Eifel*.

N. SILURIAN.

- | | | |
|---------------------|--|--|
| 31 Upper Silurian.. | <ol style="list-style-type: none"> a. Tilestone of Brecon and Carmarthen. b. Limestone and shale, Ludlow, Shropshire..... c. Wenlock or Dudley limestone | <ol style="list-style-type: none"> Oldest of fossil fish yet discovered. Trilobites and Graptolites abundant. Brachiopoda very numerous. Cephalopoda : Bellerophon, Orthoceras. |
| 32 Lower Silurian.. | <ol style="list-style-type: none"> a. Caradoc sandstone, Cær Caradoc, Shropshire..... b. Llandovery flags, calcareous flags and schists,—Builth, Radnorshire, Llandovery, Carmarthenshire..... | <ol style="list-style-type: none"> Same genera of invertebrate animals as in Upper Silurian, but species chiefly distinct Trinucleus : Caradoc, Cystidæ, p. 358. No land plants yet known. Foot prints of tortoise, see note. p. 360. |

- | | | |
|---------------------|--|---|
| 31 Upper Silurian.. | <ol style="list-style-type: none"> a. Tilestone of Brecon and Carmarthen. b. Limestone and shale, Ludlow, Shropshire..... c. Wenlock or Dudley limestone..... | <ol style="list-style-type: none"> Oldest of fossil fish yet discovered. Trilobites and Graptolites abundant. Brachiopoda very numerous. Cephalopoda : Bellerophon, Orthoceras. |
|---------------------|--|---|

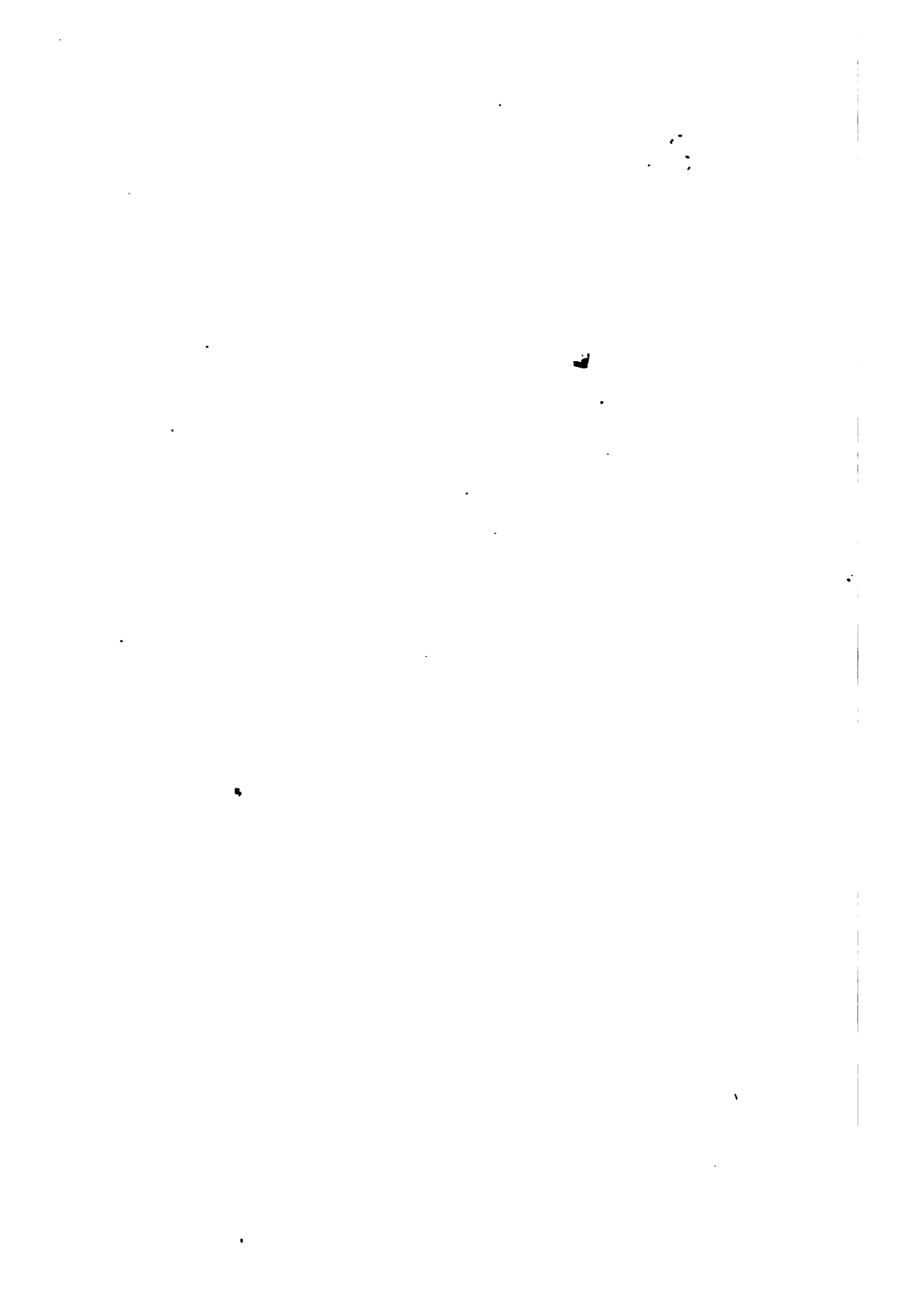
1. SILURIAN SANDSTONE. *Wessela* near *Beraun*.
2. *ATRYPA GALKATA*. *Hurst hill*, near *Dudley*.
3. *ATRYPA TEREBRATULA*. *Lineata*. *Tournay*, *Belgium*. *Devon*.
4. *CALAMOPORA SPONGITIS*. Silurian Rock. *Bensburg* near *Cologne*.
5. *CELLSPORA*, *MADREPORA*, *RETIPORA*, *ENCRINITES*.

No.

6. CALYMENE BLUMENBACHII. Head of, Silurian, *Dudley*.
7. CORALS from *Dudley*. LIMARIA CLATHRATA. Silurian.
8. CORALS. Upper Silurian, *Wenlock*.
9. CYSTIPHYLLUM SILURIENSE. Upper Silurian, *Dudley*.
10. EUOMPHALUS FUNATUS. *Dudley*, 1837. Dr. M.
11. EUOMPHALUS FUNATUS, t. 17-20.
12. GRAPTOLITES LEVIGATUS. Silurian, *Bohemia*.
13. GRYPHEA GLOBOSA (OSTREA). Baculite Limestone.
14. ORTHIS HYBRIDA. Silurian, *Dudley*.
15. PENTAMERUS KNIGHTII. Aymestrey Limestone, *Sedgeley*.
16. PHACOPS CAUDATUS. Aymestrey Limestone, *Sedgeley*.
17. PENTAMERUS KNIGHTII. Aymestrey Limestone, *Sedgeley*.
18. STROMATOPORA CONCENTRICA. Silurian, *Dudley*.
19. SPIRIFER BILOBA. Silurian, *Dudley*.
20. TEREBRATULA SUBLEPIDA. Silurian, *Dudley*.
21. TEREBRATULA RETICULARIS. Silurian, *Dudley*.

32 Lower Silurian.. { a. Caradoc sandstone, Cwr Caradoc, Shropshire..... } Same genera of invertebrate animals as in Upper Silurian, but species chiefly distinct Trinucleus caractaci, Cystidæ, p. 359.
 { b. Llandeilo flags, calcareous flags and schists,—Builth, Radnorshire, Llandeilo, Cwmarthenshire..... } No land plants yet known.
 { } Foot prints of tortoise, see note, p. 360

22. AGNOSTUS PISIFORMIS. Silurian, *Sweden*.
 23. ASAPHUS EXPANSUS. Silurian, *Russia*.
 24. ASAPHUS RANICEPS. Silurian, *Russia*.
 25. ATRYPA GALEATA. *Hurst hill*, near *Dudley*.
 26. GRAPTOLITHUS. Lower Silurian, *Scotland*, *Hurtfell*, *Dumfriesshire*.
 27. OGYGIA BUCHII. Lower Silurian, *Cambrian of Sedgwick*.
 28. ORTHIS BIFORATUS. Silurian, *America*.
-



TO BE HAD AT THE MUSEUM.

REPORTS FROM THE GOVERNMENT CENTRAL MUSEUM,
giving an account of its origin and objects,

PRICE—*One Rupee.*

REPORT FROM THE GOVERNMENT CENTRAL MUSEUM,
giving a description of the Marbles of Southern India,

PRICE—*One Rupee.*

REPORTS FROM THE GOVERNMENT CENTRAL MUSEUM,
giving an account of the Iron Ores of Southern India,

PRICE—*Two Rupees.*

CATALOGUE OF THE GOVERNMENT CENTRAL MUSEUM,

containing: Catalogue of the Aqueous Rocks as Mineral
Structures: Catalogue of the Aqueous Rocks and Fossils

in the order of their Superposition: Geology of Ma-
dara, its Rocks and Minerals; and Geology of

Timnevelly—PRICE—*One Rupee, Eight Annas.*

CATALOGUE OF THE BRITISH SHELLS IN THE MUSEUM,

PRICE—*One Rupee.*

CATALOGUE OF THE FOSSILS IN THE MUSEUM—PART II.

PRICE—*One Rupee, Eight Annas.*

CATALOGUE OF THE MINERALS IN THE MUSEUM

to illustrate the Physical and Chemical characters of Minerals.

PRICE—*One Rupee, Eight Annas.*

